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DEPARTMENTS OF VETERANS AFFAIRS AND HOUSING AND URBAN DEVELOPMENT, AND INDEPENDENT AGENCIES APPROPRIATIONS FOR FISCAL YEAR 1990

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE

COMMITTEE ON APPROPRIATIONS

UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

FIRST SESSION

ON

H.R. 2916

AN ACT MAKING APPROPRIATIONS FOR THE DEPARTMENTS OF VETERANS AFFAIRS AND HOUSING AND URBAN DEVELOPMENT, AND FOR SUNDRY INDEPENDENT AGENCIES, BOARDS, COMMISSIONS, CORPORATIONS, AND OFFICES FOR THE FISCAL YEAR ENDING SEPTEMBER 30, 1990, AND FOR OTHER PURPOSES

PART 2 (Pages 1–677)

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
NATIONAL SCIENCE FOUNDATION
OFFICE OF SCIENCE AND TECHNOLOGY POLICY

Printed for the use of the Committee on Appropriations

U.S. GOVERNMENT PRINTING OFFICE
92-982 ⇉ WASHINGTON : 1990

S181-16

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, DC 20402

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VA, HUD, AND INDEPENDENT AGENCIES APPROPRIATIONS FOR FISCAL YEAR 1990

MONDAY, APRIL 3, 1989

U.S SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 1:35 p.m., in room SD–138, Dirksen Senate Office Building, Hon. Barbara A. Mikulski (chairman) presiding.

Present: Senators Mikulski, Grassley, and Kerrey

NATIONAL SCIENCE FOUNDATION

STATEMENT OF ERICH BLOCH, DIRECTOR

ACCOMPANIED BY:
  MARY GOOD, CHAIR, NATIONAL SCIENCE BOARD
  SANDRA TOYE, CONTROLLER
  JOHN MOORE, DEPUTY DIRECTOR

OPENING STATEMENT OF SENATOR MIKULSKI

Senator MIKULSKI. The subcommittee will come to order.

Today the subcommittee will begin its hearing on the budget for the National Science Foundation for the fiscal year 1990.

BUDGET REQUEST

The National Science Foundation is requesting a 14-percent increase in fiscal year 1990 that would make its total budget almost $2.15 billion. This request, while consistent with the agency's goal of doubling its budget between 1989 and 1983 comes at a time of great austerity to the Federal Government and this subcommittee.

Last year the agency received a 9-percent increase in its appropriation, less than what was requested, but nearly a 13-percent increase in terms of what the Department of Housing and Urban Development received.

I am extremely supportive of America's basic civilian research efforts, and I believe we need to do all we can to make sure that civilian research efforts are maintained, but I believe it is going to be extremely difficult to fully fund the administration's National Science Foundation request.

I am also troubled at the growing dependence on the Department of Defense for R&D work. While the amount devoted to civilian research has remained fairly constant in recent years, our defense R&D has increased dramatically.

It is my hope to be able to explore this issue and other issues with our Nation's economic competitiveness with Dr. Bloch and his National Science Foundation team.

In addition, I will be interested in finding out what the Foundation's commitment is to helping train the intellectual infrastructure which will provide our country with the scientific and engineering capacity for the 21st century.

NSF's own figures suggest that the average age of a science teacher in the United States today is over the age of 50, and I am concerned that the Foundation may not be investing the resources our country needs to build that teacher capacity, that intellectual infrastructure that we are going to need for tomorrow.

Finally, it is my hope to work with Dr. Bloch to help our research universities and scientists develop a greater sense of commitment to their own communities and to our Nation. Too often I have found that research funding from the Federal Government, and ultimately the Nation's taxpayer, is often viewed as an entitlement rather than an investment in America's future.

If research universities and scholars want to double NSF's budget over the next 5 years, then they are going to need to convince this committee and Congress that they are willing to double their commitment to the Nation in terms of a national impact and also to engage in community service in their own areas.

It seems too often we become interested in funding research grants rather than looking at it in terms of a national strategy and national goals.

While universities focus heavily on their own internal research goals, I often wonder where they are in developing the capacity to train teachers and also the teaching situation in their own universities. The maxim "publish or perish" is all too frequent a phrase we hear among university faculties these days. We also hear "research or die," but I have yet to have a research university come in and tell me how desperate and dying they are to teach, to teach undergraduate students and to get them excited about our country, its future, and what they will engage in either in the public or private sector.

Research is a goal, and its outcome is to be focused again on what is our national interest. A university is to be a center of learning, not only about the world around us, which research does, but a center of learning for the students.

I hope that as we focus so much of our national attention on postdoctoral students that we remember that the heart and soul of America is what we do in universities at the undergraduate level, for it is the undergraduate level that will have the greatest impact on our society.

So those are some of the things that I have in my mind as we take a look at the budget, and I want to welcome Senator Grassley from Iowa, who I know shares those concerns as well as some of the famous land grant colleges in our country.

Senator Grassley, do you have an opening statement?

Senator **Grassley**. No; I do not have an opening statement.

I want to welcome the witnesses.

HEARING PROCEDURE

Could you give us a preview? There are 2 days of hearings with us here, and could you tell us if this is just 1 day continuing into the next?

Senator **Mikulski**. Yes, Senator; we are going to deal with the National Science Foundation this afternoon. Tomorrow morning we hope to complete our hearings with the National Science Foundation. Their $2.15 billion budget is one of the big tickets in this subcommittee. Then we will turn to the President's National Science Adviser, the current one.

Senator **Grassley**. So in a sense there is a day and part of a day of a general hearing in any way affecting the National Science Foundation?

Senator **Mikulski**. Yes; and if you feel that you cannot be here tomorrow, feel free to bring up some of those questions that you would like today because we are open for questions at any point in the budget.

Senator **Grassley**. You have answered my question.

Senator **Mikulski**. Senator Kerrey, did you have an opening statement?

PREPARED STATEMENT

Senator **Kerrey**. I have an opening statement that I would just submit for the record.

Senator **Mikulski**. Without objection.

Senator **Kerrey**. The only thing that I would say at the outset is that I have a great deal of interest in the development of scientific resources and a great deal of respect for what NSF has done in Nebraska to further that end. So I'm very interested in your testimony and the work that you're doing and I look forward to working with you.

[The statement follows:]

Statement of Senator Kerrey

I am pleased to welcome Mr. Bloch and to hear his testimony, for I believe the National Security Foundation has a pivotal role to play in science and engineering education, in basic research, in the technological advancement of our society, in our nation's ability to compete in international markets, and in our general economic well-being.

I was a teenager when Sputnik was launched. I was a patient at the Philadelphia Naval Hospital recovering from wounds suffered in Vietnam when Neil Armstrong and Edwin Aldrin walked on the moon. I was in business and thinking about entering a Governor's race in 1981 when the space shuttle first sped beyond the clouds. I saw in these lessons and opportunities, a setback followed by success stories, what I understood to require—and be—a new national commitment and, at least in part, the fruits of that commitment.

I am, consequently, somewhat dismayed at parts of your testimony and the supporting materials supplied which tell me—

- that from a population of 4 million high school students, we can expect only about 200,000 baccalaureate scientists and 10,000 doctorates while demand for such persons will increase;
- that only 1 in 20 students who go on to college receive baccalaureate degrees in science or engineering;
- that well over half of all engineering Ph.D's granted by American universities now go to non-citizens
- that the challenge from Japan and Europe apparently accelerated in the 1970's and 1980's despite our awareness of it;

- that in terms of civilian R&D, the U.S. is now behind Germany and Japan—and even Korea—and about even with France and the U.K.; and
- that Federal support for basic research, in constant dollars, has increased little over the past 25 years in relation to total R&D spending.

Don't get me wrong. I am impressed by many of your activities and by your response not only to these generic issues but also to specific ones such as the Antarctic Program and global environment.

But, I am also looking to you today for some answers. Our nation has lost some of the technological leads that we had. One of NSF's statements noted that over two-thirds of the goods we produce today must compete, either in the domestic market or on the world market, against other producers. We are challengted today in the fields of computers,scientific instruments, drugs and pharmaceuticals.

Our trade deficit, our gross national product, our standard of living are all tied up in this. We sit here today looking at a critical situation. But, there were harbingers, there were indications—and many times we didn't miss them. So I come back to questions: were our responses ill-conceived, not enough? Did we not fully appreciate the situation? Did we not provide the resources?

I've read about doubling the NSF budget and about your initiatives—and I think we need to move in that direction. I believe in our country. I believe in our people and our capabilities. So, I hope that NSF can help us understand more about where we have been and where we need to go. For that, along with the resources, can be a major contribution to our nation's well-being as we approach the next decade and century.

INTRODUCTION OF ASSOCIATES

Senator **Mikulski**. Dr. Bloch, we look forward to your testimony and working with you.

Mr. **Bloch**. Thank you, Madam Chair.

First of all, I want to congratulate you on your assumption of the chairmanship of this committee, and we are looking forward to continuing the dialog that we started last year with you and continued during your visit with NSF earlier this year on important science policy issues, such as the one that you raised yourself in your opening statement.

Before I start, let me introduce my colleagues with me.

Dr. Mary Good on my right is the Chair of the National Science Board, but she is also vice president of research and development of the Allied Signal Corp.

On my far left is Dr. John Moore, the Deputy Director of the National Science Foundation who you met before, and Sandra Toye next to me who is the Controller of the Foundation, and you met her also yesterday.

I have a long prepared statement which I would like to enter into the record, but what I would like to do is just highlight some of the things rather than going through it.

Senator **Mikulski**. Without objection, your entire statement will be in the record, as will be Senator Kerrey's opening statement.

Mr. **Bloch**. Thank you very much.

BUDGET REQUEST

We appreciate the opportunity to discuss NSF's budget request with this committee. The budget request, as you stated, is $2.15 billion, or a 14-percent increase, and I think a big increase at this point in time deserves a discussion and a justification, and that is what I would hope to do in the next few minutes.

NSF is here to serve the needs of the Nation in the science and technology area, and I want to underline that, the need of the Nation, and not the need of the scientists and engineers.

I certainly agree with your comment that you made before, that the grants that we are giving out are not entitlements at all. They are an investment in the future, and I have said this many times myself, an investment in the future of the country, and I think we want to keep that in mind. I think you will find, and I hope you find, that this underlies all of our programs that we are considering and that we have been implementing.

We see NSF as a catalyst for change, seeking better ways to respond to national issues and goals. I must say that for too long NSF has been perceived as a passive agency just waiting for proposals to come in the door, concerned only with science and the academic community.

That image, and it was never quite correct I should say, that image is certainly out of date today. NFS's concern today is not just with science, but with engineering as well. We are concerned with education, we are concerned with human resource development. In fact, education and human resource development is the fastest growing part of the Foundation's budget.

ECONOMIC COMPETITIVENESS

We are catalysts for cooperation between universities, the Government, and industries so that knowledge can move smoothly from university laboratories to the point where they have an economic payoff.

The biggest problem that the Nation faces is economic competitiveness. This was brought home to us, especially over the last decade, but also before that, when American industry lost market share and when we lost whole industry sectors.

But to be able to compete in the marketplace we have to compete in research also. There we are facing a similar challenge. Other countries are closing the gap with us. We have seen our investment in civilian research lagging behind that of some of our major competitors, for instance. We have looked at declining rates of production of new scientists and engineers, while those of our counterparts in the world have been increasing.

We all have read about the unacceptable mathematics and science teaching in our elementary and high schools compared to that of our trading partners. A large part of NSF's activities are aimed at improving competitiveness by doing something about these problems that I have just outlined, and they are by no means a full catalog of the problems.

Our engineering research centers and science and technology centers build links between universities and industry while focusing basic research on problems that are economically significant but beyond the resources of individual researchers.

Our investment in supercomputers and the networking to use them efficiently improves our research capability while strengthening our supercomputer industry. And we put this program in place, this was one of the mandates that Congress put on us, to make sure that we were supporting what was at that time a fledgling supercomputing industry.

There are many more examples that I could cite, Madam Chair, like materials research where new materials are an important aspect of our productivity in the future and the cost factor in the future. Important efforts in molecular biology and related work in chemistry and engineering lie behind the development of the new industries of biotechnology. We are a small player in that particular area.

Other agencies of the Federal Government have a much higher investment in it, but I believe we are an important participant in these activities in terms of basic research and in terms of education.

PROGRAMS RELATED TO ENVIRONMENTAL CONCERNS

Another major area in which NSF programs respond to national needs is the environment. Many basic programs in biology, chemistry, and the geosciences are important to environmental issues. I want to note just three special efforts because they stand out in our budget request.

First, the global change initiative. It's a good example of the cooperative interagency approach that we are encouraging. You have copies of the report, "Our Changing Planet," which was submitted by the President as part of his budget submission to Congress, and that describes this activity in fair detail.

The report describes a very complex program in which NSF will cooperate with NASA, DOE, NOAA, EPA, and USDA in a coordinated research effort that will total about $190 million in 1990. We are going to provide about a quarter of that total. The effort began in 1989 and will be a continuing activity.

A second effort with the environmental label is biodiversity. It's a research area that is important to the environment. The world has a serious problem in the loss of genetic diversity which can have an adverse effort on economic development, and we propose to increase this effort by about $11 million in 1990.

The third area under this label of environmental concerns is Antarctica. Because of a fatal accident of one of our contractor personnel in 1986, I initiated a review of the health, environment and safety problems by a special panel. We have now begun to act on their recommendations with a request of $10 million as part of our Antarctica request to start on the most urgent problems.

Over the next 5 years we will ask Congress for a total expenditure of about $180 million for safety, health, and environment. Our concern with environmental problems in the Antarctica is evidenced most recently by the shipwreck and oilspill from an Argentine naval vessel carrying tourists to Palmer Station. Our scientists rescued more than 200 persons from the ship and minimized the oil spillage, not avoiding the oil spillage, but minimizing it.

We then airlifted special equipment with the help of the Navy and experts to further contain the damage. Safe operations in the Antarctic will always be very difficult. With the largest presence on the continent, the United States must set an example and lead the effort to keep Antarctica operations safe and address environmental problems.

THREE NSF BUDGET THEMES

Competitiveness and environmental concerns are good examples of NSF responses to national needs. Underlying these responses is a strategy that we put in place several years ago, and that remains the best guide to our developing programs.

The strategy consists of three elements, education and human resources being the first with the highest priority; the second, the support for the basic disciplinary programs; and the third, support for centers and groups.

It also reflects our basic priorities at NSF, people first, equipment and instrumentation second, and bricks and mortar last. These have been our priorities for many years, and Congress in many hearings has agreed that these are proper priorities.

Let me talk about the three strategic thrusts for a minute.

EDUCATION AND HUMAN RESOURCES

First, the education and human resources thrust. We are all aware of our education problems. The President has stated his intention to do something about them and so have many Governors and other State and local officials. It's time to act, for nothing is more important than education to assure our economic success and national security.

The education and human resources effort at NSF will rise almost 22 percent, the largest increase among the three strategic themes that I outlined a minute ago. Part of this increase supports efforts to broaden the human resource base, on which the Nation can draw, to attract larger numbers of women, minorities, and other groups that have not historically participated extensively in science and engineering.

Their participation is an issue of equity and need, because by the end of this century about 85 percent of the new entrants to the labor force will be women, minorities, or new immigrants. We cannot do without the contribution of these people to our scientific and technological future.

About 55 percent of the human resources effort at NSF is in the programs that we label "science and engineering education," which has its own appropriation. These include such activities as teaching materials development, precollege teacher programs, teacher enhancement, and instructional equipment.

But many of the programs administered through other parts of the Foundation also bear on the issue of human resources and education. Special programs for undergraduate students, for women and minorities, for undergraduate faculty and special curriculum efforts in chemistry, biology, and computer sciences are integrated with our research programs. The long-term trend has seen spending for this category rise tenfold since 1982.

In 1982, for instance, we spent about $4 million on all of our precollege programs. In 1990 we are asking for $129 million for teacher programs, materials development, informal education, and the young scholars program. In 1982 there was no undergraduate program at all. In 1990 the undergraduate efforts will total about $105 million.

We are requesting important growth in graduate education programs. The number of graduate fellows will nearly double between 1987 and 1992 with special emphasis on minorities and on women in engineering. These increases show NSF's real commitment to human resource development.

DISCIPLINARY RESEARCH

The second thrust, as I mentioned before, has to do with basic disciplinary programs. It's really the core of much of our basic research effort in NSF. It accounts for about 60 percent of our total budget. It will increase by about $131 million, or 11 percent, in 1990. It's research in virtually every discipline, in the physical sciences, in engineering, and in the social sciences, as well as others.

Twenty thousand individuals participate in that in one form or another, and 1,500 institutions participate in one form or another. It includes such activities as global change, materials research, and other programs related to competitiveness or the environment. Many other activities, including a new high magnetic field facility and disciplinary programs from astronomy to zoology, are also being considered.

CENTERS AND GROUPS

The third trust is centers and groups. It's an expanding area that reflects the need to tie universities and industries more tightly together. It's a continuation of a direction that we took in 1983 with the engineering research centers.

The thrust is a way of organizing research, rather than particular research areas. It allows more interdisciplinary work, and getting industry and sometimes national labs involved helps to make sure that new knowledge actually gets used.

Centers are a good way to leverage scarce Federal research dollars with industry and State money. It's more than a one for one dollar match in the engineering research centers, for instance, that we have experienced over the last 3½ years.

This area is growing by 18 percent or by about $57 million. That's smaller than the increase for basis disciplinary programs in absolute dollars. We are going to establish 8 to 10 new science and technology centers in addition to the 11 that we started in this fiscal year, and it continues the direction we began to take in 1983 with the engineering research centers.

Even with this growth, centers of all sorts, the engineering research centers, the science and technology centers, the minority centers, the plant science and biology centers, earthquake center, material research laboratories, remain a small part of the Foundation. I do not expect it to grow beyond about 10 percent of the total, even as the Foundation budget doubles in the next few years.

INTERAGENCY COORDINATION

Many of our programs involve some degree of interagency coordination. I already mentioned that in the environmental area and also in the science and technology center area. A Government-wide effort is very important in many of these activities.

Another area is education. Recently I met with Secretary Cavazos to pursue cooperation in precollege education. Such cooperation will be increasingly important as we look for ways to make the President's commitment to education effective within realistic budgets.

PRIORITY SETTING

I know the committee is interested, as we all should be, in the problem of setting priorities among science and technology programs. I have spoken frequently of the need to do this and so have many others.

We take priority setting and planning seriously in NSF. It goes on during the whole year, involves the whole Foundation and the National Science Board. The planning for a 5-year period covers strategic thrusts as well as large projects. Priorities are obviously set at many different levels. The easiest way to set them is at the level of the individual discipline where committees of experts make informed judgments leading to the selection of the best grants. It's more an apples to apples comparison.

Judgments between disciplines are more difficult. It's more like comparing apples and oranges. Here we rely on groups with broader perspectives, blue ribbon panels, as well as on the very important work that the National Science Board does to overview the totality of our effort.

The criteria for deciding are more varied in those areas. The effect on human resources, industrial competitiveness, on the development of disciplines, on geographic distribution, and so forth are all factors that go into the decision of which priority to give to what.

In all of this, the national interest is foremost on our mind, so that the tax dollars are used to secure the long-range benefit of our Nation.

SUMMARY OF STATEMENT

Madam Chair, let me summarize. The Foundation's programs are designed to be responsive to the Nation's needs, to provide the stable support that research programs must have, because many of our programs stretch over many years, sometimes decades, and sometimes multiple decades.

The three strategic themes balance the need for stability with the need for change. Balancing the need for new knowledge today with the need to invest in the people who will provide tomorrow's new knowledge is foremost on our minds.

I believe the programs are a wise investment for the American people, and I urge your support for our request.

Thank you very much, and Dr. Good would like to say a few things also.

[The statement follows:]

STATEMENT OF ERICH BLOCH

MADAM CHAIR AND MEMBERS OF THE SUBCOMMITTEE:

I would like to take this opportunity to discuss the Foundation's budget request for FY 1990. Our budget request emphasizes an important investment in the people, knowledge, and partnerships that are essential to scientific discovery, technological innovation, and national economic and social progress.

CHANGES IN SCIENCE AND TECHNOLOGY POLICY

In the past several years there has been a significant change in the way the Administration, Congress, and the country view the role of science and technology in national and global affairs. The Foundation has played a major part in re-shaping that role.

As a nation, we recognize that in many areas we can no longer take our world leadership for granted. That is equally true with regard to product competition in the world marketplace and also in research and technology. The world is highly competitive, and our ability to meet this competition is being seriously challenged in many areas. Where American technology was the best in the world in nearly every field, now other nations are closing the gap, becoming our equal, or -- in certain fields -- drawing ahead of us.

We also recognize that knowledge has become a significant economic resource -- perhaps surpassing in importance traditional natural resources and labor costs.

A consequence of these changes in global and economic dynamics has been an increased awareness of the importance of technological innovation in making the country internationally competitive, and the long-term effect of investments in education and research on our economic and general welfare.

NSF has changed in recognition of these developments. Where we once could operate with little regard to issues of national concern, we now focus our efforts and our role with those issues in mind. Where we were once more passive, responding primarily to the needs of science as expressed by scientists, we are now catalysts for change -- instigating scientific efforts and cooperation needed for broader progress. Where our relationships at one time were primarily with the scientific academic community, they now include the engineering community, industry, and the teaching profession, as well.

Due to Congress' and the Administration's focus on NSF and the resulting increases in our budget, NSF is now a more important participant in federal science and technology efforts. Our programs focus on strategic areas that are directly related to long-term scientific achievement. These efforts have resulted in significant changes and accomplishments.

NSF funding enables scientific and engineering research at the frontier of knowledge through our support of university basic research and its associated infrastructure, which are our primary source of research knowledge and trained personnel. For example, an explosion of research results in high temperature superconductivity followed important breakthroughs made by NSF supported research teams. Another example is supercomputers. NSF established the first program providing widespread academic access to supercomputing capacity through its national supercomputer centers. That access has led to significant achievements such as the first mapping of the common cold virus and major progress in computer visualization techniques, for example. Today there are numerous other academic supercomputer facilities that followed on the heels of NSF's program, and that augment the availability of this important new resource.

NSF has placed human resources development at the top of its list of priorities. Our programs are designed strategically to increase the numbers of young people concentrating on science and engineering and to improve the quality of the education they receive. Well trained scientists and engineers are indispensable to our national efforts; but American students have not been pursuing careers in science and engineering in sufficient numbers to meet future needs. To educate our students in the sciences, our teacher population needs a better educational base, more recognition of its critical mission, and new entrants to fill future needs. Unless we do a much better job at attracting students and giving them the best possible training, we cannot meet the challenges we face in international competition.

We have established programs throughout NSF that address education and the human resource issue in many different ways. There have been dramatic increases in support for education at all levels and efforts to broaden participation of underrepresented groups, such as women and minorities; and underrepresented institutions, such as undergraduate colleges and others. Support for education and human resources has grown from about 3% of the NSF budget in 1982 to over 15% in 1989. Another tangible result of these efforts is a substantial growth in the numbers of people -- students at all levels, teachers and research faculty, and investigators -- supported under NSF programs, which has more than doubled over that period.

The Foundation has also challenged the traditional ways research is organized and carried out in an effort to stimulate the transfer of knowledge and promote cooperation of the participants. Our emphasis on centers and groups -- together with supporting individual investigators -- has stressed multidisciplinary research and topics important for the sciences and engineering and relevant to economic growth and development.

The center concept, which encourages strong industry participation and interaction, has created an entirely new research culture at universities. In fact, a number of centers have been established by academic institutions with the help of state and industry funding, as a result of relationships developed in developing unsuccessful but otherwise viable proposals for NSF support.

New Relationships

As NSF's role in education, science, and engineering changes, new relationships need to be forged.

Industrial participation in many of our programs is important not only for the monetary support that it provides, but because it improves communication between important sectors of our society. Initiatives such as the Engineering Research Centers and Science and Technology Centers, the Industry - University Cooperative Research Centers, and the Presidential Young Investigators program serve to facilitate knowledge transfer and establish new working relationships that hasten progress and improve focus on common interests.

We have had conversations with the National Governors

Association, individual Governors and state administrators to encourage increased coupling between NSF and state financed programs.

International relationships are increasingly important. The rising cost of research, budget realities, and the increasing strength of our trading partners in the research arena have made it vital to gain access to their research competence and to pursue joint efforts in areas of mutual interest. Areas such as astronomy, physics, cosmology, earthquake research, and global environment are particularly important for such relationships.

Many of our programs also involve cooperation with other agencies. The U.S. Global Change Research Program is an especially interesting example of the interagency cooperative approach we are encouraging. Education is another example. We are pursuing cooperation in this area with the Department of Education as we look for ways to make the President's commitment to education more effective within probable budget constraints. For example, we have jointly supported children's television programming, such as "3-2-1 Contact"; and various national education assessment efforts, such as the National Assessment of Educational Progress.

Continuity and Future Planning Environment

Change is a necessary condition for progress and growth. Changes in our perspective on the role of science and technology and changes in the way NSF carries out its traditional role in promoting the health of science have provided a fresh focus, set the stage for a series of new initiatives, and invigorated existing programs.

In addition to change, continuity, stability, and a predictable planning environment are important. Research results are not usually achieved in short periods, and many research problems have very long horizons. Social and economic problems are many years in the making and require sustained efforts to correct. New challenges continually arise, and we need to be prepared to respond to them.

The commitment by the Administration in the 1989 Budget and in this request, and the Congress' commitment in the 1989 Authorization Act, to double the Foundation's budget goes a long way toward providing that stable planning environment. It will allow us to focus on building the research infrastructure and emphasizing those areas most related to national challenges and opportunities.

Challenges and Opportunities

The Federal budget request for FY 1990 again emphasizes as one of our highest priorities, the need to strengthen U.S. technology and competitiveness through research.

Global Environment. As important as our response to the technological challenges of a global economy may be, so too is our understanding of the global environment and the effects of man-made influences on it. The issue of global change is of obvious critical concern. It illustrates - perhaps better than any other example - the enormous scale, complexity, and multidisciplinary nature of many research areas. The NSF part of the overall FY 1990 U.S. Global Change Research Program is 29% of the total. Our program supports the geosciences and other efforts that seek to understand how the earth functions as an interconnected system. Research in the Antarctic area, uniquely important to our understanding of several phenomena related to climatic change, is one example. A separate, but closely related initiative in Biodiversity, focused on understanding the extent and environmental implications of the loss of species and habitats, is another. These activities require not only direct support for research, but large-scale operations and logistics.

Materials. A rapidly expanding scientific knowledge base is providing significant opportunities to advance the state of the art in materials processing. Everyone is aware of the rapid developments in superconductivity that promise important technological advances and economic benefits. Materials research is also having great impact on the development of applications involving semiconductors, submicron circuitry, microelectronic technologies, surface technology, composite materials, and other areas.

New Research Tools. The exploitation of opportunities for new research discoveries with important economic potential is often paced by the availability of special tools that extend the limits of computational capacity, experimental conditions, and measurement.

For example, forefront research in a number of physical and biological science areas depends on scientific access to high magnetic fields.

Research efforts in high performance computing and communication will advance computer and information science and engineering, as well as serving the broader needs of investigators across all disciplines.

The pace of technological development depends on the knowledge generated by research. Breakthroughs in critical areas are requiring an increasingly expensive multidisciplinary and capital intensive approach. We must make the necessary resources available for basic research, or face the negative consequences for productivity, competitiveness, and economic progress.

Priorities

A few words about priority setting should be said. Within NSF there is a continuing need to set priorities across fields of science and engineering and among many competing initiatives of importance and high merit. This is no different in principle from the problem faced by Congress in considering programs across all areas of national responsibility. We cannot accomplish everything within available resources, and choices must be made.

At NSF, overall priority setting is accomplished through a broad framework of information gathering and strategic planning. The Foundation's Long Range Plan for FY 1989-1993 was published last summer, and we have already begun re-examining the assumptions and environment upon which it was based. Our FY 1990 budget was developed in the context of that long range plan, and our priorities flow from its broad objectives and themes.

Our planning and priorities involve information, advice, and expertise from a large range of people and organizations from all sectors. The process involves disciplinary advisory committees, academic and National Research Council task groups and committees, academic and industry associations and committees, our own professional staff, and the National Science Board. The planning, priority setting, and budgeting is done within the context of, and takes into account, national goals, the health of science and education, scientific needs and opportunities, and many other factors.

Within our directorates, hard choices are made among highly meritorious projects. These choices are also made within the context of overall Foundation priorities and objectives, and involve an extensive merit review process. Each directorate also engages in a broadly based advisory process that assists in overall priority setting within disciplines.

There are no easy choices, and priorities must be continually reassessed in light of new developments and opportunities. In the long run, however, the Foundation's first priority has been people, both in developing human resources and in research support. Our second priority has been the instrumentation needed for education and research. Our third priority remains the larger, shared facilities that provide access to advanced instrumentation and computational capabilities.

NSF BUDGET REQUEST

The FY 1990 budget request for the National Science Foundation is $2.149 billion, an increase of 14% above FY 1989.

Table 1
NSF FY 1990 Request
(dollars in millions)

Research & Related Activities	$1803.0
U.S. Antarctic Program	156.0
Science & Engineering Education	190.0
	$2149.0

As previously noted, this request is consistent with NSF's doubling strategy and supports needed growth in the nation's science and engineering research and education efforts. We believe it also reflects the growing awareness of the importance of U. S. science and technology in responding to national and global challenges and opportunities.

Our request again emphasizes three thrust areas:

- Education and People -- There is an urgent need to address the human resources issue across all parts of the educational pipeline.
- Knowledge generation -- We need to strengthen the traditional disciplinary research base and the facilities that support it.
- Multidisciplinary Cooperation -- Our group and centers research programs promote new partnerships in attacking problems and exploiting new knowledge.

PEOPLE: EDUCATION AND HUMAN RESOURCES

The 1990 request includes over $347 million for support of education and human resource development. This is an increase of almost 22% over FY 1989.

Education and Technical Personnel

Support for education and human resources continues to be one of our highest priorities. The nation's science and technology efforts ultimately depend on an adequate supply of highly trained and educated people.

Last year I presented some striking facts that bear repeating:

- Less than 20% of high school sophomores are interested in careers in natural sciences or engineering.
- Only 1 in 20 students who go on to college receive baccalaureate degrees in science or engineering.
- Less than a third of them continue training; and only a quarter of those who do, eventually receive doctorates.

Thus, from a population of 4 million high school students, we can expect only about 200,000 baccalaureate scientists and 10,000 doctorates. (Figure 1) Past trends suggest that demand for scientists and engineers will increase for years to come. (Figure 2) With the number of college age students dropping steadily, we face a potentially serious shortage of technical personnel unless a greater proportion of the student population is attracted to science and engineering.

Our approach in supporting education and human resources has been wide-ranging, and involves efforts by all parts of the Foundation.

Our emphasis on this issue has resulted in significant increases in the support of education, especially in pre-college and undergraduate areas. NSF support of individuals throughout its programs has increased substantially, as well. (Figure 3)

The Foundation's precollege programs are the largest component of our education and human resources effort. Pre-college activities will again emphasize teacher preparation and instructional material development, especially in middle school mathematics.

NSF Pre-college support has increased dramatically since 1983. Nevertheless, the NSF role in pre-college education is very small in relation to federal and state support for education, and focuses only on science and mathematics. We can lead and stimulate others to lead and to innovate. The States - which bear the principal responsibility for education - must step forward with renewed efforts in this area. We need to continue to encourage partnerships among the state, local, and private players concerned with responsibilities in these areas.

Pre-college science and mathematics education has a potentially large impact on the long-term prospects for the recruitment and retention of scientists and engineers. While today's efforts in this area pay off sometime in the next century, we also need to attract more university and college students from today's cohorts.

One way of encouraging more students to pursue scientific and engineering careers is through the improvement of undergraduate education. Such programs are another area of NSF emphasis. The Foundation has developed a comprehensive range of undergraduate programs that, in FY 1990, will increase by over 62% to almost $105 million. These efforts involve programs across NSF and include support for student research, faculty enhancement, course curriculum development, and instructional instrumentation.

We have also focused significant efforts on broadening participation of groups and performers now underrepresented in science and engineering.

Attracting and retaining minorities and women in science and engineering means overcoming special and longstanding problems. Yet, changing demographics indicate that underrepresented minorities and women will make up a much larger proportion of student populations and new workforce entrants than today. It is essential to look to all segments of our population for the scientists and engineers we need. NSF has increased and added new programs in this area, such as Research Careers for Minority Scholars; Career Access Opportunities for Women, Minorities, and Disabled; Minority Research Centers of Excellence; and other targeted programs.

KNOWLEDGE GENERATION: DISCIPLINARY RESEARCH AND FACILITIES

A primary focus of both federal investment in R&D and NSF support is university-based basic research and capacity. The FY 1990 request includes more than $1.3 billion for disciplinary research and the facilities that support it, an increase of 11% over FY 1989.

U.S. universities and colleges are the major performers of basic research and the primary source of our technical workforce. The knowledge produced by the university-based research system is the primary fuel for innovation and, ultimately, economic strength. However, the need to re-emphasize the role of university-based research is increasingly apparent.

Trends in Support

I have noted before that the NSF research and related appropriation in constant dollars has been almost level for several years. (Figure 4) Related trends in the overall federal budget indicate:

- Federal support for basic research, in constant dollars, has increased little over the past twenty-five years in relation to total R&D spending. (Figure 5)
- Within civilian R&D, the share of federal support going to universities and colleges has been falling, even though the dollar amount has increased since 1980. (Figure 6)

These trends are significant because it is basic research performed at universities and colleges, including the various physical science and engineering programs included in the NSF appropriation, that is of primary importance in fueling industrial competitiveness and understanding the global environment. We must invigorate those programs and fields of support where the challenges and opportunities are greatest.

We previously highlighted broadly-based efforts in multi-disciplinary research focusing on global change, biodiversity, materials, and high performance computing. Continued growth is also requested in other high priority areas such as genetics, mathematics, microscale chemical processing, and software engineering.

It is also important that we address the need to increase the size of NSF project grants, including the need to boost funding for small-scale instrumentation.

The request includes increases for maintaining and upgrading the five advanced supercomputing centers, and to expand and improve services provided by NSFNET.

The need for better access to high magnetic fields for research in many areas of the physical sciences is vital. Higher magnetic fields than are currently available would significantly enhance progress in several areas, including superconductivity. Many other nations have upgraded their magnetic field capabilities. Our 1990 request includes plans for a new facility to meet the needs of U.S. researchers, the National High Magnetic Field Laboratory.

The character of U.S. activity in Antarctica has changed from expeditionary to permanent scientific presence. With this change has come a recognition that safety, health, and environmental concerns must be addressed in a serious way. Our request includes a major, multi-year initiative to improve those conditions in the region.

MULTIDISCIPLINARY COOPERATION: CENTERS AND GROUPS

We have stressed the importance of cooperation among the various players in the research enterprise and the economy as a necessary element in promoting technological innovation. Progress in many areas of science depends on collaboration between investigators from different fields and between industry and universities.

NSF has been a leader in developing new ways to encourage this cooperation. Our group and centers research programs have promoted new partnerships and cooperation among the players. They have encouraged multidisciplinary cooperation among individual investigators and the sharing of costly research tools in addressing large and complex research problems. They have provided a setting that forges linkages between universities and industry, and between federal and state government. They have created unique educational opportunities for many undergraduate, graduate, and postdoctoral students.

The university-industry cooperation fostered by the centers concept has included significant industrial participation in NSF supported programs. This has meant more resources focused on university research in the form of industrial participation. We estimate that over $300 million in industry contributions was generated in direct support of all NSF programs in FY 1988, about a third of which was in centers and group research.

Support for research centers and groups totals $376 million in the FY 1990 request. This includes funding for 8-10 new Science and Technology Centers, and additional new centers in several other established areas, including Engineering Research Centers, Comprehensive Regional Centers for Minorities, and the Industry/University Cooperative Research Centers.

I want to address the continuing concern of those who feel that support for centers has been at the expense of support for individual investigators.

Through the centers programs we have encouraged multidisciplinary and organizational linkages that provide new approaches to research and using research knowledge. We believe these linkages provide a healthy diversity and serve to complement traditional, single-investigator initiated research. They often create opportunities for investigators to work in ways that can enhance individual creativity. They do not and will not replace individual research projects as the primary mechanism of NSF support. The number of individual investigators supported by NSF grants continues to increase and will be a continuing priority.

Focusing on the organization of research should not down-play a fundamental objective of NSF: to support the best research performed by the best people. This has always been our primary concern, be it by individuals, in groups, or centers.

SUMMARY

The National Science Foundation has proposed a budget for FY 1990 that will contribute in important ways to strengthening U.S. technology:

- Through the efforts of highly trained and educated people from all segments of our population;
- Through the knowledge generated by university-based research in all fields of science and engineering; and
- Through a diverse research environment, emphasizing multidisciplinary cooperation and participation of all research sectors.

Our nation's continued commitment to significant long-term investment in these essential elements of our research efforts will ultimately determine our success in exploiting technological opportunities, maintaining economic competitiveness, and meeting environmental and other challenges.

Congress and this committee have been instrumental in promoting the importance of education and research to our national interests. I know we can count on your continuing support in considering our request.

FIG. 1

PERSISTENCE OF NATURAL SCIENCE AND ENGINEERING INTEREST FROM HIGH SCHOOL THROUGH PH.D. DEGREE

(The Pipeline)

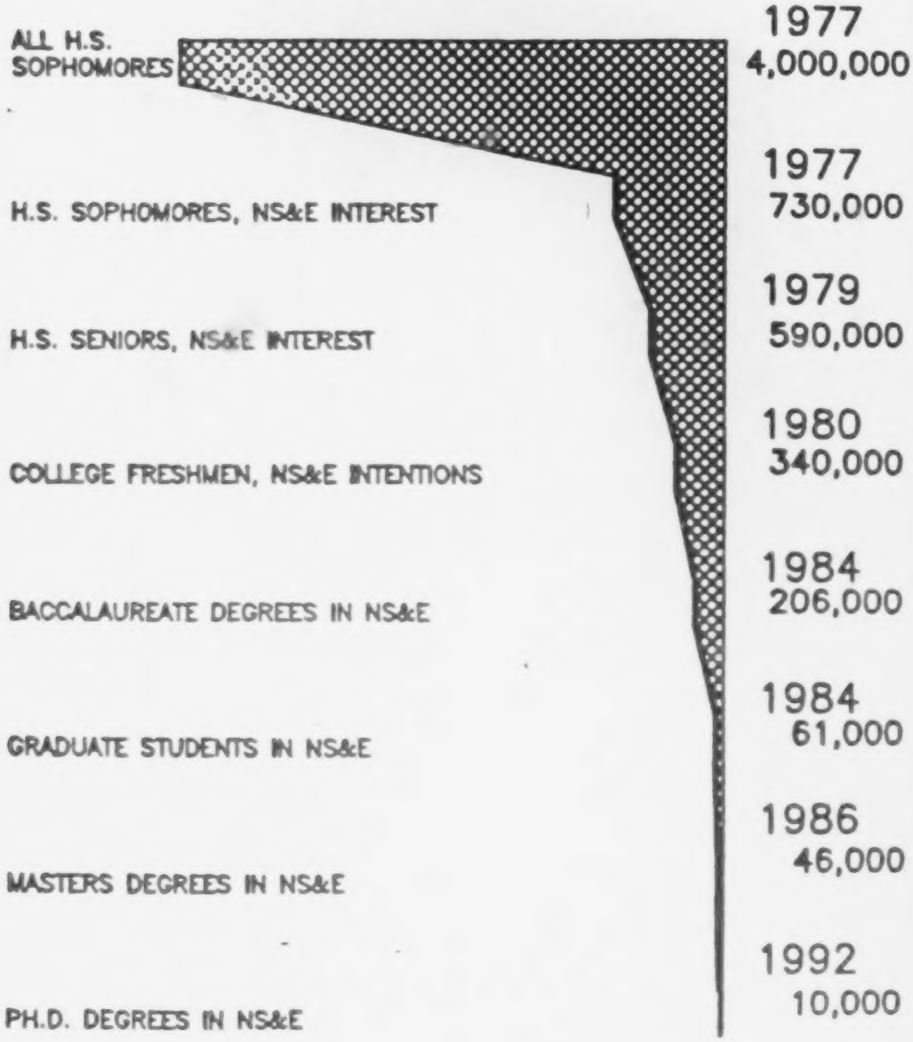
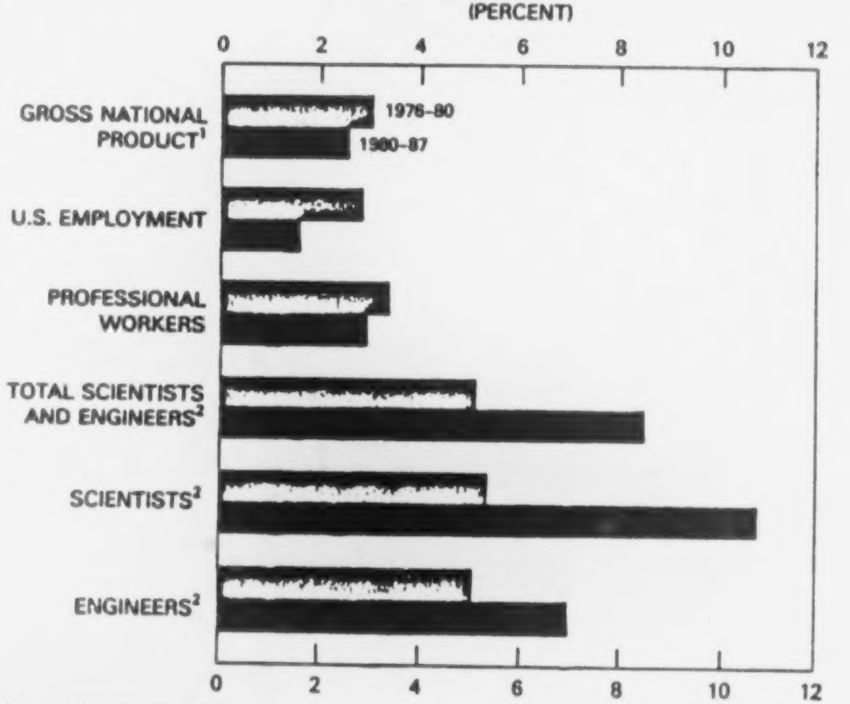


FIG. 2

AVERAGE ANNUAL GROWTH IN SCIENCE AND ENGINEERING EMPLOYMENT AND OTHER MANPOWER AND ECONOMIC VARIABLES

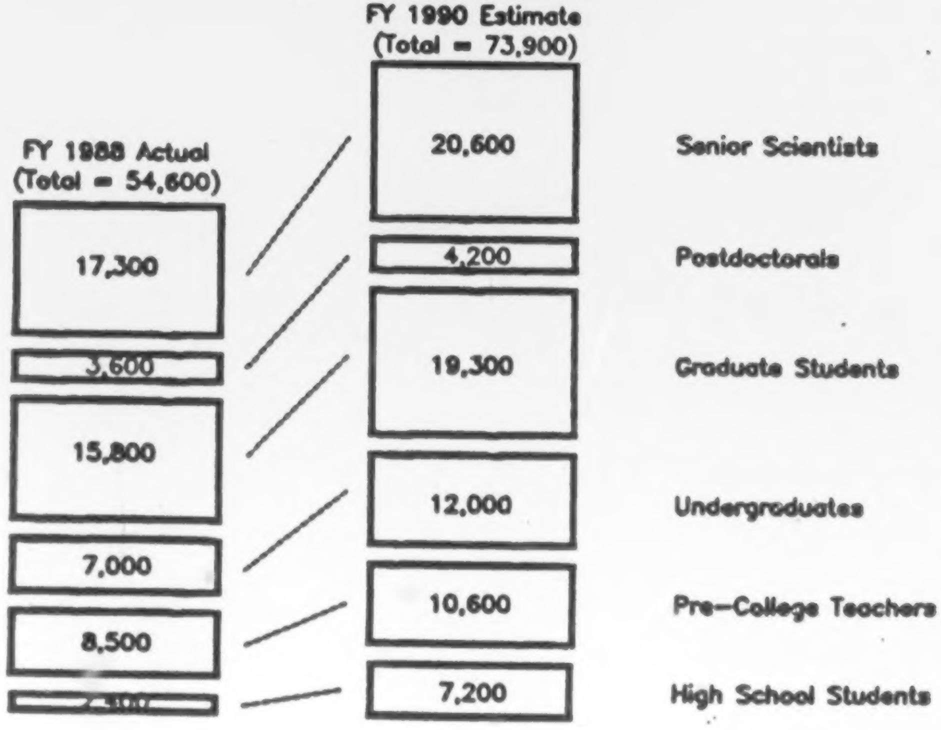


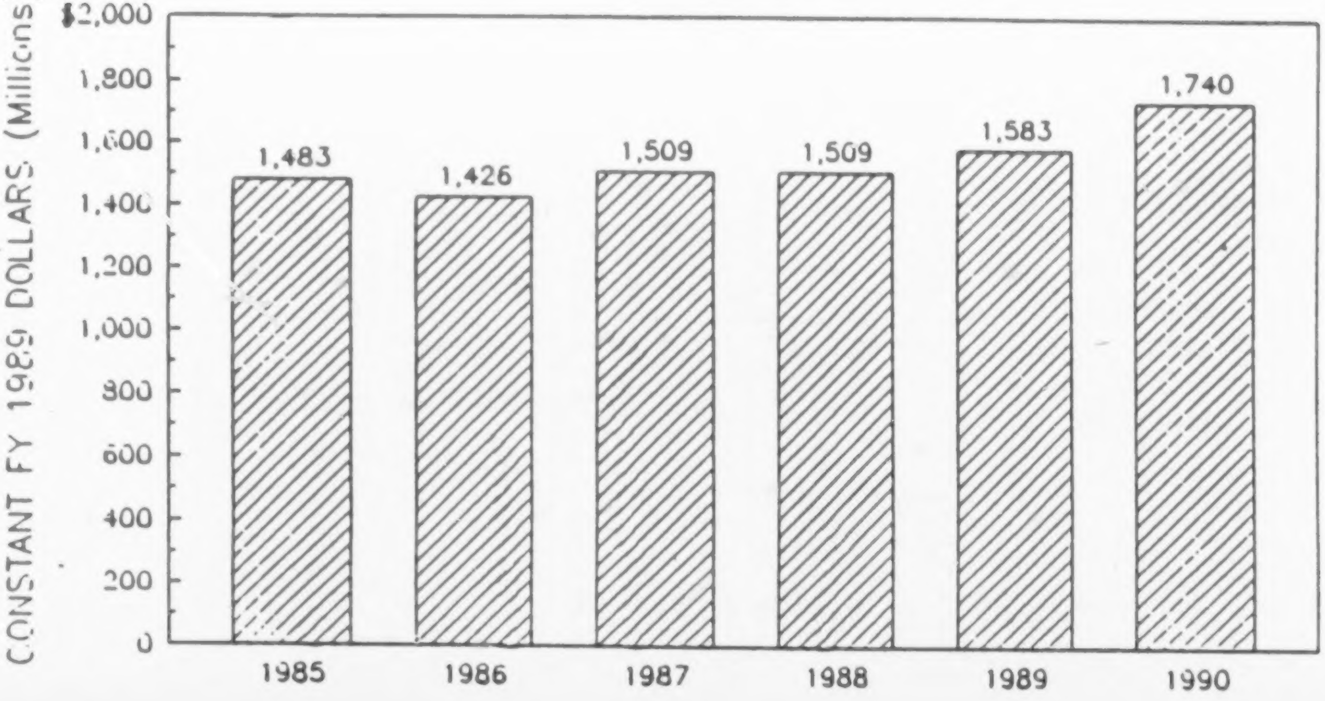
[1] BILLIONS OF 1982 DOLLARS.
[2] DATA REFLECTS 1976–80 AND 1980–88.

SOURCE: NATIONAL SCIENCE FOUNDATION, SRS.

FIG. 3

NATIONAL SCIENCE FOUNDATION
SUPPORT FOR HUMAN RESOURCES



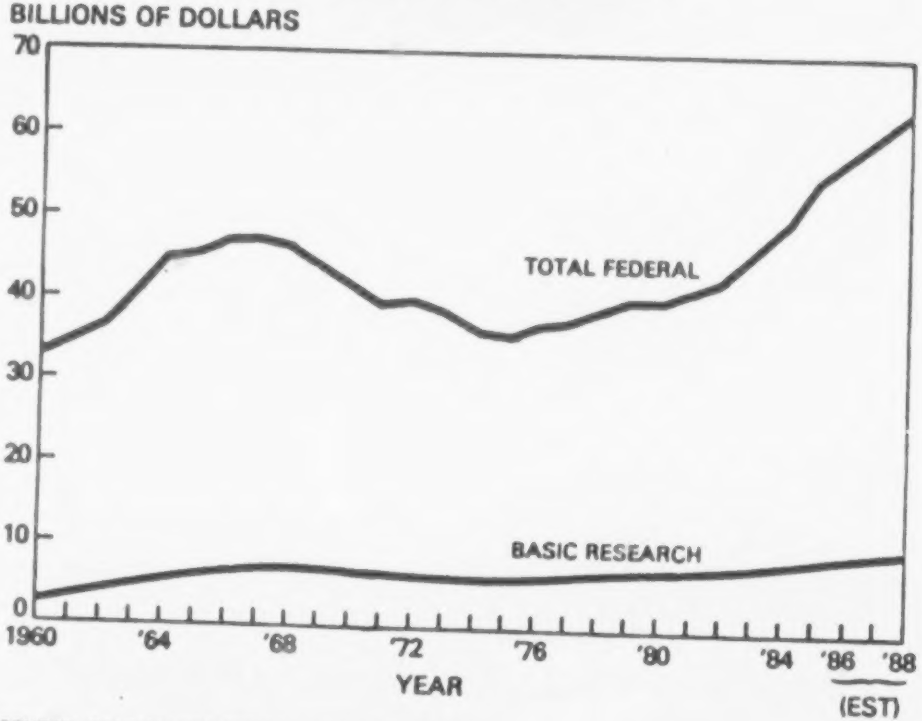


RESEARCH AND RELATED ACTIVITIES
CONSTANT DOLLAR BUDGET TRENDS
FY 1985 – FY 1990

FIG. 4

FIG. 5

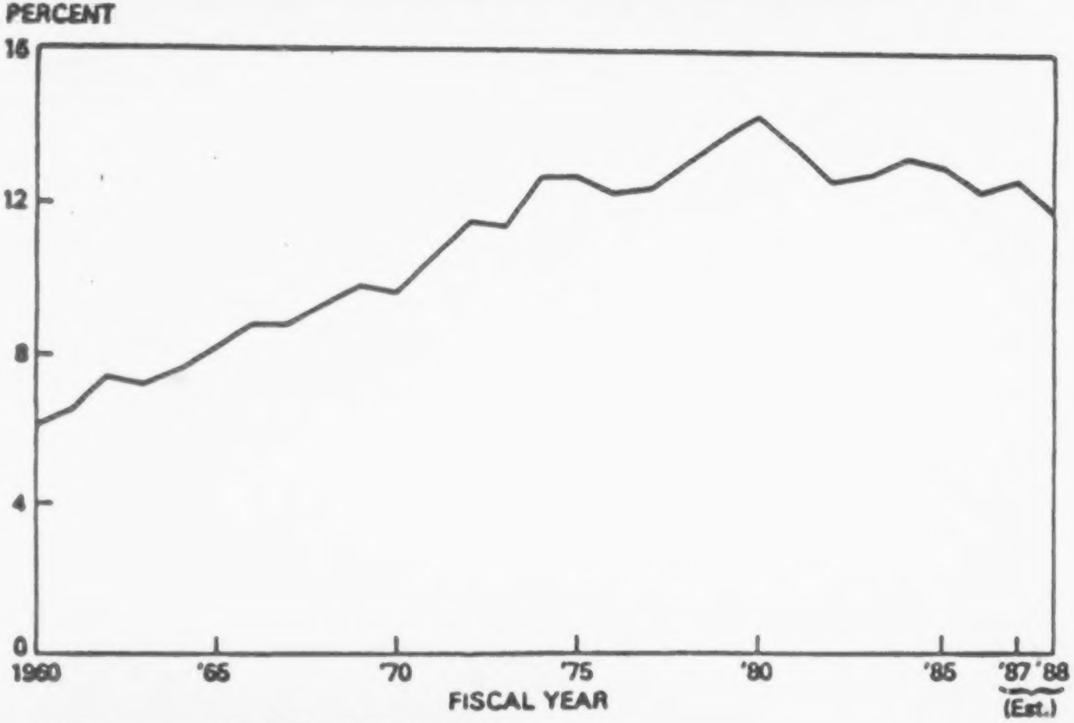
TOTAL FEDERAL R&D AND BASIC RESEARCH EXPENDITURES
1960 — 1988
(1987 CONSTANT DOLLARS)



SOURCE: DIVISION OF SCIENCE RESOURCES STUDIES.

FIG. 6

FEDERAL OBLIGATIONS FOR R&D AT UNIVERSITIES AND COLLEGES AS A PERCENTAGE OF ALL FEDERAL R&D



SOURCE: DIVISION OF SCIENCE RESOURCES STUDIES.

STATEMENT OF DR. MARY GOOD

Dr. GOOD. First of all, Madam Chair and Senators, I'm very pleased to be here today.

As you know, the National Science Board has a great responsibility for the programs and the programmatic thrust at the Foundation, and I wear two hats today.

A couple of the comments that I wanted to make—and I have no written comments for the record—come from two points of view. One is from the view of the National Science Board itself, and the other is from the American industry today, which is trying to be as competitive as it can in some of these issues.

First of all, I would like to tell you that the three themes that Mr. Bloch has presented have been well thought out by the Board, and we are very much in favor of the kinds of thrusts which he has outlined for you. We are particularly interested in the education and human resources thrust.

EDUCATION AND HUMAN RESOURCES

The Board over the last couple of years has taken really what I would call almost a renewed interest, although we have always had an interest in this whole issue of manpower and students. But I think we have come to the conclusion that this truly is almost a crisis type of issue. So the education and human resources area is one that we take very seriously and, if you will notice, we have asked in this budget that the largest increase go into that particular endeavor.

On the other hand, with the Foundation's budget compared to the amount of money that is spent in the country on education, our very best hope is to be a catalyst in these areas and to be able to lead the way in how we might improve both science teaching and science literacy.

I would like to make one comment. We have two problems in this area. One is the whole issue of students in science who are going to stay in science and who are going to be part of the science infrastructure. The other has to do with the fact that we have become a technological nation in the sense that our businesses and our standard of living depend upon the use of technology in many forms. But we as a nation—for the most part—are technologically illiterate, and that is not a happy situation for the future.

So there really are two issues. One is the issue of education for students who we need for this science infrastructure and the other is how do we go about providing the science and technology background for the public at large which will allow them to understand what our society is all about and how to best participate in it.

NSF CENTERS

The other issue I would like to speak a moment about has to do with the other two areas. Let me speak first about the cooperative programs, the centers. The Board spends a lot of its time talking about centers, trying to decide how they should be funded, trying to discuss the mechanisms that are the most appropriate for them, and how do we go about setting those up so that we get, as they say, the biggest bang for the buck. That is really what the issue is all about.

The quality of those is the major issue, because if we don't maintain their quality, they are really not very valuable. They are the mechanism for providing interdisciplinary programs today, and many of our current science programs and technology programs are very interdisciplinary in nature, and this is one of the ways to get that interdisciplinary thrust across.

Let me say one thing about that. Those programs for the most part have been very well received by the industrial participants. There is a lot of participation in the centers from the industry, and I think you will find that, if you visit with us, this is an area where we have been very complimentary as to what the Foundation has been able to do.

DISCIPLINARY PROGRAMS

Let me just say a word or two about the disciplinary programs, which are in many ways the basis on which the Foundation operates and in which our science infrastructure operates. That base is extraordinarily important. We do have a problem today. In many of our programs in the disciplinary areas, we have programs where the success rate of quality proposals is down in the 20- to 30-percent level. That's very difficult to manage, particularly when you have only one out of five proposals that gets funded. This gets to be very difficult to decide where the quality cutoffs come and how to decide. We have many, many high-quality proposals today which do not get funded on that basis.

EUROPE 1992

Let me close my introductory remarks by just making an observation. I made a trip to Europe a couple of weeks ago on company business. As you know, we are all interested in this issue of Europe 1992 and what it is we are going to try to do about that. Industry is concerned that we have focused on the Japanese issue for a long time, and all of the sudden it's extraordinarily important that we focus two eyes, one eye on one direction and one on another, because we have another group coming on rather strongly, and the issue of 1992 is very important.

So I made a trip to look at the whole issue of research and development and what we might be able to do in terms of collaborative efforts between our company and some efforts that are going on in Europe today.

Just to give you a couple of comments about that. First, I was able to visit several of the research universities, as they are called in Europe. I also had an opportunity to visit a couple of what really now would be comparable to our State technology institutions. One thing I can say is they are coming along very, very fast, particularly some of the new institutions are very fresh and very innovative. They are doing some extremely nice things. We are going to have to run very hard to stay even, and it will not be an easy thing to do.

So I think the issue, and my view on the National Science Foundation's role, if you will—in the infrastructure and the whole R&D

effort—is that if you look at what is going on in the rest of the world, one of the areas where we still are doing very well is in this whole area of fundamental science and the development of technology. We are not doing as well in some of the issues of utilizing that technology. On the other hand, we must not throw out the Foundation in the process of learning how to do the technology development better.

So we need to learn how to build a complete infrastructure where the science leads to new technology, where we have the underpinning that is necessary to make it go. To do that we have to have the people, and without the people the whole issue is moot.

We also have to have a climate where creativity and entrepreneurship can flourish. That really is our strength. If you look at other parts of the world, that's the one thing we have that is ahead of everybody else, and that's an area where we can do well.

So let me say that we feel very strongly that the Foundation's program is truly a very important issue for the Nation at large.

I appreciated your comments up front, I agree with some of your concerns and would be happy to discuss them as we have time.

NSF PRIORITIES WITH RESTRICTED BUDGET

Senator MIKULSKI. Thank you very much, doctor.

We are going to follow the 10-minute rule for questions and probably go through a couple of rounds with the members.

Mr. Bloch, you're asking for an additional $263 million for your 1990 budget, a 14-percent increase over fiscal 1989. Now let me leap ahead because you know what is happening with Gramm-Rudman, the budget talks and so on.

It could be that we would face the very strict limits on discretionary spending to meet the Gramm-Rudman deficit target of $100 billion. That could mean limiting most agency funding to current services or below, and what I'm trying to do is look ahead to what the Budget Committee is going to give us.

CBO estimates that current services for NSF would mean an increase of about $80 million to $80.5 million, which is $184 million less than your request. Now that is all background.

My question is, if we are forced to take this request because of the Gramm-Rudman restraints, what areas would you say you have proposed for increases, what is your must-do list and what would you recommend that could be reduced?

Mr. BLOCH. Well, first of all, Madam Chair, I hope that this is an academic question, but I take it very seriously because——

Senator MIKULSKI. This is an academic exercise that is a real one.

Mr. BLOCH. That's exactly my concern. I think if we are curtailed to $80 million, we are trying to, first of all, keep our priorities in line with what they are today. And, by the way, we were faced in 1986 with the same kind of a situation where we wound up with minus 2 percent compared to the previous year. We protected at that time women and minority programs, we kept our priority of people, instrumentation, and equipment intact, we scaled down many of the increases that we had asked for, and we would do the same this time.

Let me assure you that we would not cut everything by the same proportion. We would be selective and we would set priorities and we would protect those areas that we know that if we lapse in those areas it's difficult to catch up. So education and human resources will be high on the agenda, some of the center activity I hope we can continue to improve, and to basic research in selected areas we would give the increases that are needed and other areas would go without an increase.

INCREASES FOR PRECOLLEGE AND UNDERGRADUATE

Senator MIKULSKI. That then takes me to some of the agency priorities, if you will. Your testimony focused a great deal in human resources and education. But while the agency requests an overall 14-percent increase in science and engineering education, the request for teacher preparation goes up by only 7.8 percent. I think that's on page 8 of your testimony. And undergraduate science education goes up only by 7 percent.

Now how can we say that education is our highest priority when these two areas, which seems to be kind of the guts of your effort, are not increasing at the same rate as the total agency, because I think we all agree that our investment in our own people and their development is really important. Right now some of us are investing more in products than we are in people and we've got to invest in people.

Mr. BLOCH. Let me take the second half of your question first. A 7-percent increase for undergraduate science is what you mentioned, which is really out of our science and engineering education part of the appropriation. As I mentioned in my testimony before, we have education programs, and in particular undergraduate education programs in the rest of the Foundation in the research directorates, and if you take the totality of the undergraduate education increase that we are asking for, we are going from something like $65 million to $105 million, and that's about a 60-percent increase.

The second thing is the total precollege effort. First of all, we are spending in 1989 about $119 million on that. We are increasing that to $129 million. That's very true. You should recognize that all precollege programs have seen a doubling since 1987. So it has had large increases.

In addition, as you know, the President has put a special emphasis on this area and has given the Department of Education a $440 million program that addresses various aspects of precollege education, among other things, but a lot of it is in precollege education.

Taking these two programs together, ours as well as the Department of Education's one, I think it's a major kind of an increase for that particular area. That's why we have been working with Secretary Cavazos to make sure that we do the right thing between ourselves and cover the areas that need to be covered.

A number of the programs in the Department of Education, as set forth by the President's initiative for that area, overlap some of our own programs and we've got to make sure that we do that right.

COORDINATION WITH DEPARTMENT OF EDUCATION

Senator MIKULSKI. Mr. Bloch, if I could interject in this because this I think the core of it is, every American counts, and we've got to make every dollar count for every American.

What are the mechanisms for coordination between your efforts and the Department of Education's efforts to make sure we are maximizing our dollars and also in taking the lead on what must be public/private partnerships, particularly in the involvement of the private sector, which many private sector companies are doing particularly in local education, the community college programs, which I think are going to be one of the major thrusts of how we are going to do it? How is that working out and is there a coordinating council?

Mr. BLOCH. No; there is no coordinating council. In fact, I will be very blunt with you, that in the past the working relationship between the Department of Education and ourselves was not the best, and I'll take part of the blame and the rest of the blame belongs to the Department of Education. I hope we can improve that.

Why do I think we can improve it? I think one of the reasons why the coordination was not as good as it could have been or should have been was the fact that the people in the Department of Education were not attuned to the mathematics and science area, which is what we are talking about when we—NSF—are talking about education. They have a much broader role in the Department of Education, and we are essentially asking Secretary Cavazos to make sure that we have counterparts that we can work with at a working level between these two agencies of the Federal Government. Secretary Cavazos has a high interest in this area coming as he does from the academic sector, as you know, and I feel very confident that we are going to work out new relationships there that are very urgently needed, no doubt about it.

INTERAGENCY COORDINATING COUNCIL

Senator MIKULSKI. Do you think as part of the Office of the Science Adviser to the President there should be some type of interagency coordinating council between those who work in the area of education, what I call bringing around our intellectual infrastructure, are people really to make sure it happens and moves at the White House so that the people who know most about this are really involved in moving it?

Mr. BLOCH. Well, there are a number of interagency councils, as you well know, that exist.

Senator MIKULSKI. And a lot of them are a bust.

Mr. BLOCH. Well, that was my next point. [Laughter.]

Senator MIKULSKI. The big bust instead of the big bang.

Mr. BLOCH. That was really my next point. What I wanted to say is I think we have to be careful that we put the councils in place and the coordinating committees in place and get them out of the way when they have done their duty. We do the first and we never do the second. Yes; I would be in favor of that in terms of education, especially in the precollege area because of the high interest that everybody needs to have and, by the way, the very little participation that we are getting from other agencies in these efforts.

VOLUNTEERISM

Senator MIKULSKI. Well, see, I think our President is really onto something when he talks about volunteerism, not that volunteerism is a substitute for public policy or public programs. What we have in our country, I think if we take a look at what can be done with the private sector, this whole energy that could be created, a whole momentum that would occur in public education if we had, first of all, a national direction, a national thrust.

I've got to believe that we could mobilize the effort from doing science education through Scouts, through public/private partnerships, through work study programs, through the kinds of things that I know Allied Signal is doing and Procter & Gambel and, actually, private manufacturers.

My concern, doctor, and I'm going to turn now to Senator Grassley, is that we can be so focused we're myopic. We are sometimes so focused on our individual research that we are myopic about what we need to be developing.

The President has got the energy and he has got the will, and this is one Democrat that really wants to work with him on this.

Mr. BLOCH. And obviously we want to support that particular effort. Now I want to pat ourselves on the back, and you should know——

Senator MIKULSKI. Go ahead because we'll be back.

Mr. BLOCH [continuing]. I want you to know that we have been working with the industrial sector in many areas. For instance, in the middle school, teaching preparation and materials preparation area we have been working with the industry sector to be part of the effort, and they are contributing to it in terms of their knowledge as well as money so that they can take the developed programs and publish them and then go off on their own. So we have done that, in this area, just as we have done in other areas.

Senator MIKULSKI. Senator Grassley.

UNDERGRADUATE SCIENCE EDUCATION

Senator GRASSLEY. Thank you, Madam Chair.

The National Science Board has suggested quite a role for the Foundation in undergraduate science education, and over the last few years you have responded with a substantial increase, I think $100 million in the budget for this year.

How well has NSF responded to the responsibility laid out by the National Science Board, given that the undergraduate initiative is dispersed throughout the entire Foundation? While you have a central coordinating office, what is the rationale for the disbursed management approach that you've taken? Is this the best way to accomplish the role laid out for you by the National Science Board?

Mr. BLOCH. Well, Senator Grassley, that question comes up every now and then, and I must tell you there are different views and different opinions on that. I decided when we put the undergraduate program in place to do it exactly that way, have some of it concentrated in the Science and Engineering Education Directorate and the rest disbursed in the research directorates.

There is an office which is in the Science and Engineering Education Directorate that oversees it all. There is a Program Manager in charge, so to speak, for this disbursed activity.

Why did we do the dispersal? It's very simply—for one reason. We wanted to make sure, I wanted to make sure and the Board wanted to make sure, that the research directorates have a stake in the success of that effort, so they are not just there to support research and only research, but also for them to focus on education.

The second reason is that they can help us formulate some of these programs that are disciplinary in nature, like biology or computer science or something like that. With their help we can get the community involved and also lay out the programs that are very important and the activities that are very important under that particular banner.

So, to get their involvement in terms of their stake in it, as well as in getting us the best advice possible, I thought one way of doing it was to spread it essentially across the Foundation, but keep, however, a central focus in place in the Science and Engineering Education Directorate.

Dr. Good. Can I add just one comment to that, please, sir. I think that what Mr. Bloch is talking about is an extraordinarily important question because the whole issue of undergraduate education, and there are lots of ways and lots of opinions as to how it can best be done, but to address Senator Mikulski's comment earlier today, is that we need some of the very best minds in the United States who are the best research people, we need to have them think about undergraduates.

One of the ways to get that done is to have part of the undergraduate program in the disciplines where they operate, and that's what we are in the process of getting done. We have some people who are, and everybody makes their list as to who is the next Nobel Prize winner, we have some folks like that who are now taking part in that program who have major NSF research grants of their own who are now adding the undergraduate thing and teaching undergraduates again and getting excited about that.

We also found, for example, in talking about getting a bang for your buck, it turns out that one of the programs in an old NSF program, which was always looked on as absolutely excellent, was undergraduate research. That—in terms of getting students to stay in science and go to graduate school and turns out to be one of the biggest indicators of whether a kid gets excited and whatever—is to be able to do some research at the undergraduate level. To do that you need to have the program in that Directorate where those people who are doing the research will take those kids on.

Senator Grassley. Are you saying, yes, the Foundation is carrying out the role laid out for it?

Dr. Good. The answer to that is yes, and I can assure you it's one of the biggest issues in the Board discussions.

DEFENSE SHARE OF R&D

Senator Grassley. On another point, some in the engineering community, specifically Robert White, National Academy of Engineering President, has suggested that the Department of Defense's share of the Federal research and development spending is too large. The United States spends a smaller proportion of GNP on civilian R&D than its major competitors, Japan and Germany.

So I would like to ask you, Mr. Bloch, do you think that some of the research and development funding sponsored by the Department of Defense, such as semiconductors, high definition television, or superconductivity could be better managed by the National Science Foundation or the National Institute of Standards and Technology?

Mr. **Bloch**. Well, you're linking two things together and let me try to separate them and——

Senator **Grassley**. I don't see them being linked together, but go ahead.

CIVILIAN SHARE OF FEDERAL R&D

Mr. **Bloch**. No; but there are two separate questions maybe and I would like to answer each one.

I agree with Dr. White that we are not spending enough money on civilian basic research. There is no doubt about it.

Senator **Grassley**. Remember, what I want to find out is whether or not you think it could be better handled by your agency than by the Department of Defense. I don't want you to avoid that question.

Mr. **Bloch**. No; I won't. I'll come to that, but can I finish with this first one and then I'll jump over to the second one.

So I certainly agree with that. I certainly agree with it because the basic research and the education components of the Department of Defense research and development budget are small and have been decreasing on a percentage basis. If that were not the case, I might have a different view on it.

Now let me jump over to the other question. You mentioned two programs, semiconductors and HDTV. Those programs were put in the Department of Defense for one reason, because that's where the money is. I think they would be more appropriately handled in a civilian agency. It doesn't necessarily have to be the National Science Foundation, by the way. In fact, I think it would be wrong to put the second one into the National Science Foundation because that's a program that is very much earmarked toward the marketplace.

Marketing, manufacturing, the design of an actual product and so forth, that's not the National Science Foundation's mission. But there are other agencies that could handle this, the Department of Commerce, you mentioned NIST, and so forth, would be more appropriate. Yes; I think that would be a better arrangement, but let's not forget why the arrangement is what it is, because that's where the money is. We would have a hard time coming up with $30 million for HDTV or $200 million for sematech.

Senator **Mikulski**. If the Senator will yield.

Senator **Grassley**. Yes.

Senator **Mikulski**. You see what Mr. Bloch is saying is the program follows the money. The money doesn't follow the program. That's No. 1.

Mr. BLOCH. That's right.

RATIO OF R&D DOLLARS

Senator MIKULSKI. And just as a benchline frame of reference, because your question really was going to be one of mine, and I think it's a superb one, Senator Grassley, is that of the national R&D dollars, 70 percent goes into DOD research and then, hopefully, development, but only 30 percent goes into civilian, and that's our total spending in NASA, the National Institutes of Health, what these folks are doing and so on.

Mr. BLOCH. Agriculture.

Senator MIKULSKI. For example, biotechnology, agriculture, and things like that, that's only 30 percent, and the rest is 70 percent. So that just gives you a picture.

Mr. BLOCH. Senator Grassley, can I make one more comment on that. Let me just remind you of two things. If you go back 10, or 15, or 20 years ago, you see more of a 50/50 split between defense and civilian R&D, federally sponsored R&D.

What Senator Mikulski mentioned before, a 70/30 split or 65/35, as it is in this budget, I think is much too unequal a split. I'm not saying it has to be 50/50, but that was closer to the truth.

The second thing is that at that time there was more of a fallout from the defense sector into the civilian sector. Think of computers, think of semiconductors, the example you brought up, for instance. If you look today, the fallout is still there, but a much diminished fallout, and the fallout is more in the opposite direction, from the civilian sector into the defense sector; think of microbiology or biotechnology as an example.

PUBLIC FUNDING AND STATE GOVERNMENTS

Senator GRASSLEY. I want to refer now to some remarks you made in my State when you were there, and I want to thank you for accepting the invitation to come and we had a very successful program.

In your speech you said:

> We need to realize that public funding of academic research makes a critical difference in economic competitiveness. We cannot sustain industrial leadership and growth without significant investment in science and engineering basic research at our universities and colleges and in our industrial laboratories.

Yet Donald Kennedy, president of Stanford University, criticizes this type of reasoning because it supports he says, and I quote:

> The pernicious notion that if one appropriates research money geographically, economic prosperity will distribute itself along with it.

So now my question. Do you believe that the public funding of academic research makes a critical difference in the economic competitiveness of our State governments and, further, do you believe that the investments that State governments are making in science and technology foundations, research centers, and high technology companies are sound economic investments?

Mr. BLOCH. Yes; no doubt about it, they are sound economic investments. I read Don Kennedy's speech, and I think I'm more right than he is, but that's a personal opinion. And I also think that the focus that we need to have today on economic competitiveness puts a special priority on the Foundation and other R&D agencies to make sure that the dollars that we are spending have some relationship to economic competitiveness.

I'm not saying, and that is why I was taking the attitude I did before on your question on HDTV, I don't think the Government should fund the design of a TV set. That's not the point. But the Government certainly should fund the basic research that is needed so that you are able, so that our industry is able, to design a TV set. I think the Government should invest money to educate our people so that we have a trained work force so that when a TV set is designed, we know how to produce it and produce a quality product. I think that is what the connection is between basic research funded by the Government, or R&D funded by the Government, and economic competitiveness in the private sector.

I think Dr. Kennedy, and I wrote him a letter on it, is much too cautious on that and steps away from the real problem, and I don't think we should step away from these problems.

Senator GRASSLEY. Thank you.

Senator MIKULSKI. Thank you.

Senator Kerrey.

PRECOLLEGE EDUCATION IN THE UNITED STATES

Senator KERREY. Mr. Bloch, perhaps one of the most disturbing things to me of the testimony that you gave and the supporting documents was the poor performance that we have with a relatively small number of high school graduates who go on to earn doctoral degrees in math and science.

Since Sputnik we have been talking about this crisis. I mean it's not like this has occurred in the decade of the 1980's, and my concern is whether or not our response has been adequate. I would like to have you comment on what you think we need to do further.

You approved in, I think, 1985, a program in Nebraska through the university's department of mathematics to train math teachers in our State. It has been extremely successful, and I say this prior to urging you to consider a grant application they have got in, or actually six Western States to follow through on it.

I mean I've got to tell you frankly that as I look at primary and secondary education, having been Governor and having tried to do what I could to improve the output, I'm bewildered. I mean I see us according to recent studies, 17th out of 17 in industrial nations in math, chemistry, physics, and biology, and I frankly don't know what all the NSF grants in the world are going to do unless we substantially improve the output.

I notice I think that you recently announced or have been doing a thing called Project 2061 that I read with interest having to do with the curricula in primary and secondary education. I just wonder if we politicians approach the problem with a sufficient amount of urgency.

I, for example, look at the starting salaries in the State of Nebraska, it's $16,000 a year, and wonder how we get our best minds to go to teach these subjects that we now here this afternoon say there is a crisis in trying to develop.

I would appreciate your comments on the subject.

Mr. BLOCH. Let me try to comment on that, and first of all on your last point, "It's a crisis." I think you can label anything a crisis if you want to. I wouldn't label it a crisis because you see some good work going on; you see improvements being made. The teachers' salary issue that you're focusing on, in some of the localities it has been improved significantly under this pressure of doing something more from a quality viewpoint in precollege education.

Second, I think it's an issue which the Federal Government cannot solve by itself. I think the localities and State governments and the counties have to support that effort because that's where a lot of the money is that is being spent, and that is where the prime responsibilities lies for curriculum, for instance, as well as——

Senator KERREY. If I can just interrupt to say that in the 1980's it's about the only place the money has been coming from at the local and at the State level in education.

Mr. BLOCH. That's right. But my point is we need to make sure that the right things are getting done at these various levels.

THE PIPELINE PROBLEM

Senator KERREY. You don't think that we have a crisis in the production of individuals that are either illiterate in mathematics and physics and chemistry and biology or that are exceptional? I mean do you think that the numbers that your own testimony indicates that are graduating out of 4 million that go on to postdoctorate work, that that's sufficient?

Mr. BLOCH. No, not at all. I just don't like the label "crisis," and that was my comment. I think it's a very, very urgent problem, no doubt about it. Maybe I quibble with you on a word, but everything is becoming a crisis and I think we should be watching out that we are doing the right things, that we have the right programs in place and that we recognize the problems.

And, by the way, there is not just one thing you can do here to change it. You have to do a number of things, a large number of things.

What the Foundation is trying to do is be a catalyst for change, be a catalyst for developing new teaching materials, for educating teachers better, for making sure that in-service are being reeducated every so often, because 5 years out of school you're obsolete, certainly in the sciences. The sciences are moving very, very rapidly. So we need to make sure of that.

We certainly have to make sure that we cooperate with every level of the society that we possibly can, and that's why we are involved with the State governments and with the Governors associations to make sure that that happens and that we not sit here isolated by ourselves.

NEBRASKA'S OPTICAL RESEARCH CENTER

Senator KERREY. Your training program that you funded in my State has been an enormous success, but I've got to tell you it also opens up the problem, and if it isn't a crisis, it's awfully close. The reason I choose the word is because I genuinely believe that part of our problem is that we haven't been inside a classroom for so long that we genuinely don't know what's going on there, and I'm talking about we politicians, myself included, by the way.

The second thing, Mr. Bloch, there has been in my neck of the woods some concern that established centers of technology under peer review are apt to be benefited more often. One of things—and I'm sure that Senator Grassley would confirm this—is that throughout the Midwest what we are desperately trying to do is to diversify that industrial base on top of agriculture and we must do it, and it is exceedingly difficult to do given what I would call for lack of a kinder word, institutional inertia that tends to resist it.

I would like to ask you a very direct question. We applied again while I was Governor for an NSF grant for an optical research center through your Engineering Research Center Program. It was denied because there were not State resources there. There are now State resources being offered with a new grant, and I would ask you just directly if you would be willing to make a site visit? I know you went there last summer, but I would like to know before even the peer review occurs if you would make a site visit to Nebraska to take a look at the center.

Mr. **Bloch**. It seems to me I have a roundtrip ticket on a trip to Nebraska if I'm not careful.

Senator **Kerrey**. I will be glad to get a private contribution so that you can come. I mean there will be no expense.

Mr. **Bloch**. Senator, I was out with Senator Grassley last summer——

Senator **Grassley**. October.

Mr. **Bloch** [continuing]. And I'll be glad to go back any time. I'm not so sure that would be helpful, by the way, with regard to the success of your application because that has to stand on its own merit and we are inundated, and that might be too strong a word, but we get more requests for engineering research centers than we possibly can ever handle.

By the way, I applaud the university that they took their application forward and got started on their own with State funds. That's one of the things that we hoped would come out of the engineering research center activity, not only funding by the Federal Government, but also the impetus of funding between the private sector and the State or between the private sector and the State and the Foundation or universities so that more of these centers can get going.

If Senator Mikulski's projection of what we will wind up with is true, then we probably won't have that kind of an opportunity, but if we would get our request, there would be another engineering research center competition, and I would encourage Nebraska to submit for it.

Senator **Kerrey**. We will, but will you come and visit us?

Mr. **Bloch**. Sure, I will visit you. [Laughter.]

DIVERSIFY INTO OTHER INDUSTRIES

Senator **Kerrey**. I mean I ask because it is exceptionally difficult, and again I don't want to make this look like it's entirely parochial, and obviously it is at least somewhat parochial, but it is exceptionally difficult to do what all of us talk about doing, and that is to try to diversify into other industries.

I see and read in the biographies considerable contact with the Midwest in this four-person presentation, and I'm sure that you understand that. It is not easy for us to do, and if you're trying to, as I believe you are, and have been an exceptionally good catalyst for action, you can be a catalyst in my neck of the woods.

Mr. Bloch. I would be glad to help.

Senator Kerrey. Thanks.

MOVING RESEARCH TO DEVELOPMENT

Senator Mikulski. We are probably going to go for two more rounds of questioning. I think we have really covered the undergraduate education. I would like to move on in my next line of questioning to R&D and then some internal agency stuff while my colleagues, very able colleagues, ask some of the policy questions.

Mr. Bloch, one of the questions that comes up both in these conversations so far is moving the research into development, and you're saying, "Well, what is your bag?" Well, that's what I want to talk to you about.

You know, our country wins the Nobel Prizes, but the Japanese and other Pacific rim countries win the markets. They take the "R" and turn it into "D." A year or two ago the Japanese in a very straight forward legal way bought 9,000 of our patents and are now turning those patents into products and profits and a trade surplus.

Could you tell me the three areas of proposed increase in your budget where the National Science Foundation will focus on moving ideas or research into development?

Mr. Bloch. Well, we have more than three areas obviously.

Senator Mikulski. I know, but in our round of questioning let's just go with three.

MATERIALS SCIENCE AND ENGINEERING

Mr. Bloch. Let me just highlight the ones which I think are very important.

First of all, the whole area of materials science, which I mentioned in my introductory remarks, is an area that is underestimated. By materials I mean all kinds of materials, ceramics, novel structural and electronic material, and biological materials related to a new industry called biotechnology. That's certainly an important area.

You have read about high-temperature superconductivity and new materials which will allow us to cut energy costs and do things that today are not economically feasible. So there is a whole area of materials science and materials engineering. I think it's one that we are trying to involve industry in so that we can move into production in a quick and responsive way.

It is a program that has many facets. Individual investigator grants play a big role in it. We have materials research laboratories and some of the engineering research centers and the science and technology centers conduct research in specific areas in materials science and engineering. So that's one.

COMPUTER SCIENCE AND ENGINEERING

The second area that we have been focusing on very heavily over the last few years has been computer science and computer engineering, a growth field in many ways and one in which we still have the lead. But, as you know, we are being pressed very hard by the Japanese and the Europeans.

BIOTECHNOLOGY

A third area, what I mentioned a minute ago, is biological sciences and biotechnology, which has a very great bearing on new developments.

Maybe Dr. Good would like to comment on the same question coming from industry.

RESEARCH TRANSFER/TECHNOLOGY TRANSFER

Senator MIKULSKI. I still want to keep talking with you before Dr. Good comments.

Now what you're saying is you develop materials and even improve processes. As I understand it, you said earlier it's not the National Science Foundation that would develop a new TV or a fax machine, but essentially what you develop are the basic new products that can be used by the private sector to develop new products. Am I correct in that?

Mr. BLOCH. Well, not quite. What we develop are the underpinnings from which new products can be designed and manufactured.

Senator MIKULSKI. And then who does that?

Mr. BLOCH. Well, the private sector.

KNOWLEDGE TRANSFER

Senator MIKULSKI. Then what is the Federal mechanism from NSF to move these underpinnings out to the point where the private sector catches on to them and uses them and goes with them?

Mr. BLOCH. The mechanisms are manyfold. First, some of the people who participate in these programs in universities move into the industrial sector. They take that knowledge with them.

The second major method to transfer that information is by having industry participate in doing the research, and the engineering research centers are an example. Also, the Presidential Young Investigator Program, which supports about 850 of our best young faculty, requires that awardees after getting base money from us, about $25,000 per year, to get more than that, he has to match our dollars dollar for dollar from industry.

That's not only done to stretch the Federal dollars, although that is very important, but to establish linkages between peers in the university and in industry, and through these connections a lot of the technology transfer does occur. Many of our centers have special industry programs where they acquaint industry with their research once or twice a year.

Senator MIKULSKI. Are you satisfied that this is moving?

Mr BLOCH. Yes. We just summarized these methods in a report and we will be glad to make that report available to the committee.

I was pleasantly surprised by the large number of mechanisms that are being used. Is it perfect? No, it's certainly not perfect.

Technology transfer is one of the biggest problems. You know, I came from industry myself a few years back, 4 years, by now, and it feels like almost 40 to me many times, but the point is that even within one company it was difficult to move research results into the development process. So it's not an easy thing to do. People-to-people connections are the best that I know of.

OFFICE OF INSPECTOR GENERAL

Senator MIKULSKI. Well, we'll come back to that, and we'll come back to you in our last round, but I would like to move on now to some of the internal questions.

One, I would like to talk about the Office of Inspector General. We're going to go to some of the internal management issues. You have established your Office of Inspector General in accordance with the Inspector General Act, and you are requesting 23 positions in fiscal year 1990. What is the status of the Foundation's efforts to set up this office, develop its operating procedures, et cetera?

Mr. BLOCH. Well, I think it's probably more appropriate for Dr. Good to comment on that because, as you know, the inspector general position reports to the Board.

Senator MIKULSKI. Doctor, would you care to comment?

Mr. GOOD. Yes; I'll comment on that. The Board has spent a lot of time on this issue, and we have managed to get our information out very early. We thought about that a long time, and we decided that the best way was to take the infrastructure we presently have in the Foundation in our audit and oversight area and have that at least as the nucleus that will be given to the inspector general.

It's nice that you ask today because as of today we believe we will have a person whom we can announce within the next couple of days as an inspector general. We conducted a national search for an individual, and to my surprise, to be honest, we got an enormous number of applications, from many very, very good people. We thought that the quality of the applicants was very high.

We ended up with three people whom we had reviewed both with the staff in-house and also some of the Board members who are on the Board's Audit and Oversight Committee. They turned out to be very good people. The last three were interviewed by Mr. Bloch and myself. We picked one, and it turned out that it was the top choice of our Board Committee as well. As I understand it, there is an offer to that person at the moment, and we expect them to accept.

BUDGET FOR THE INSPECTOR GENERAL OFFICE

Senator MIKULSKI. Well, that's great. Let's talk about the other things you're going to need. The reason I'm asking this is not because NSF has an unsavory reputation, but there is this growing concern in our country around fraudulent research and where people want to make a big name and are less than meticulous in what they do. We feel that a good inspector general helps keep everybody on their toes.

Now the National Science Foundation's full budget, if we are able to do it for you, will be about one-fifth the size of NASA. NASA's Office of Inspector General receives about $9 million annually. How much do you plan to give your IG? A ratio proportionate to NASA would mean that you would give it $1.8 million.

Mr. **Bloch**. First of all, as Dr. Good indicated, we have an Office of Audit and Oversight in place, and the Inspector General Office will absorb that Audit and Oversight Office.

You should also know that our Audit and Oversight Office did not do all the audits themselves. They were contracted out.

Senator **Mikulski**. Yes; we know how they were farmed out. It's really peer review.

Mr. **Bloch**. So the comparison with NASA is not quite correct and I would like to submit a comparison for the record.

[The information follows:]

COMPARISON OF FY 1990 INSPECTOR GENERAL BUDGET REQUESTS FOR NASA AND NSF

[In thousands of dollars]

	Total dollars requested	Total FTE requested	IG dollars requestedd	IG FTE requested	Percent of total dollars for IG	Percent of total FTE for IG
NASA	$13,147,395	23,861	$8,795	146	0.07	0.61
NSF	2,149,022	1,230	2,645	23	.12	1.87

Note: NSF inspector general costs estimate includes salaries, benefits and support costs for 23 FTE as well as $1,300,000 for contract audits.

Senator **Mikulski**. Well, also, that method is not going to be as acceptable in an IG's office either.

Mr. **Bloch**. Well, I don't know. We have to see how that develops. It's a pretty good method because we're sharing it with HHS, for instance, that has similar requirements.

Senator **Mikulski**. Well, they are not very high on my list either in terms of some of the way this science is happening. [Laughter.]

Mr. **Bloch**. I'm sorry I mentioned that organization. [Laughter.]

Senator **Mikulski**. Well, look at it this way, because the American scientific community has discredited itself over the last 3 years in a couple of areas. So let's just be blunt. Your budget suggests that you're going to be making close to 18,000 grant awards, up nearly 1,300. That amounts to with your 23 auditors, et cetera, of them looking at about 778 or 800 grants for each person in your IG's Office, an actual increase in your workload. I mean you're going to have 23 people keeping track of 18,000 grants, and the question is, Is that going to be a good way to do that?

Mr. **Bloch**. Undoubtedly we are going to increase the size of that Office, but we are also going to rely on other departments and agencies of the Government and do much of the audit ourselves.

Senator **Mikulski**. Are you going to do any random audits?

Mr. **Bloch**. Absolutely; I've done that.

Dr. **Good**. Let me make one comment. The discussion that we had with the inspector general candidates were very candid, and the whole issue from the Board's point of view is that the inspector general will have the authority to do whatever they feel is appropriate. They will not be hindered.

Senator **Mikulski**. And will they have the resources, from the budget that you're submitting?

Dr. **Good**. That's correct.

Mr. **Bloch**. Yes.

Dr. **Good**. And what we have put into the budget is a start. If that inspector general comes back and says, "Look, I can't do what I need to do to make this go," then we will rearrange some budgets to make that happen. We are very serious about the inspector general, and we will put whatever resources are necessary to make it go. But remember that the Foundation already has in place a pretty decent audit and oversight activity. The Board has taken that responsibility very serious for a long time, and we will provide whatever resources we have to. But I think we have to let the inspector general come. Each agency is quite different, and what they need and how often they need to do things and what they see as necessary will vary. We have not put any strings on them, we won't and we will rework the budget if we need to.

Senator **Mikulski**. That's right. The spirit and intent of the inspector general is to be an independent auditor both in terms of fiscal accountability and then also to be sure that the standards are being met.

Dr. **Good**. And the Board not only agrees in theory, but we agree in principle.

Senator **Mikulski**. Senator Grassley.

NATIONAL TECHNOLOGY POLICY

Senator **Grassley**. Again, I want to take off on something that Robert White said. He complained that while the United States has a science policy, it has no technology policy. So speaking to the needs of an economically competitive effort on our part he said, and I quote:

> While the debate in Washington centers largely on the priorities for scientific activities, these debates, however important, are only loosely coupled to the fundamental issue that our country faces.

So, Mr. Bloch, do you believe that the United States needs to establish a national technology policy?

Mr. **Bloch**. Well, some people will also tell you that we don't have a science policy either, and there is some truth in that also. Yes; I believe we need that. By the way, I think Congress moved on that last year when it established a new position in the Department of Commerce of Under Secretary for Technology. I look at that office, as well as the Science and Technology Adviser of the President, as the centers for that activity.

I have talked to the new Secretary of Commerce to make sure he understands that we have an interest in that and that we want to work with that Office and himself, because I think the dividing line between science and technology or between science policy and technology policy is not a very precise one. It's an overlapping one and we've got to make sure that we work together on that. So, yes; I support that.

Senator **Grassley**. Well, then you're saying that the National Science Foundation should be involved, or do you think it ought to be a lead in implementing and developing a national technology policy?

Mr. **Bloch**. I think we should be involved, certainly, and where we can we should take the lead. I think we have done that. We have done that through our programs and through preparing our own strategic plan.

Senator **Grassley**. Maybe I ought to ask you, do you think the National Science Foundation ought to be the lead agency in the development of a national technology policy?

Mr. **Bloch**. No; probably not because I don't know what being the lead agency really means. There are a lot of agencies that have a high stake in it, and a large number of resources involved, Commerce being one of them.

Senator **Grassley**. Let me ask you, what role do you think the National Institute of Standards and Technology should play in the implementation and development of a national technology policy?

Mr. **Bloch**. A great role and, by the way, they have played a role in that area since its existence. The new name change highlights that even more than in the past, and I think they have a lot to contribute to it in terms of resources as well as their connections with industry, which has always been one of the hallmarks of their success. So I think they have to be a participant in it and a catalyst for making policy.

OVERLAP BETWEEEN NSF AND NIST

Senator **Grassley**. Well, do you see the new mission of the National Institute of Standards and Technology in any way overlap or conflict with the mission of the National Science Foundation?

Mr. **Bloch**. No; neither a conflict nor an overlap. In fact, we have met with the management of NIST to make sure that we know what they are doing and they know what we are doing so that we can work together and avoid unnecessary overlap.

Senator **Grassley**. Then you're saying there are some responsibilities the two agencies should share?

Mr. **Bloch**. Absolutely.

Senator **Grassley**. I would like to have you explain to me how the National Science Foundation's strategic manufacturing initiative is different from the NIST's automated manufacturing research facility and NIST's manufacturing technology center's program.

Mr. **Bloch**. It's quite different. Let me talk about the first one first. Their automated facility is a pilot facility to pull together in one spot and to demonstrate what can be done with new technology.

Our manufacturing research effort, which is distributed throughout the country in a number of universities, in some of the centers, and in individual grants is really doing the basic research that is required to put automated machinery together to understand robotics so that you can design and apply a robot. So what we are doing is very basic research, and what they are doing is a pilot demonstration project. That's not quite true, but it's almost true. So it's quite different from what we are doing.

I'm sorry, what did you say, their technology center?

Senator GRASSLEY. Yes; the manufacturing technology center's program.

Mr. BLOCH. That is a program which is aimed, and there are three that have been established or have been announced so far, that's aimed at small manufacturers primarily, 2-men shops, 10-men shops, 15- and 20-men shops, to support them in implementing new technology. It's quite different from what our center effort is doing, which again is research with anybody who can participate, small or large companies and so forth. So that's a quite different program.

SEMICONDUCTORS AND HDTV

Senator GRASSLEY. Then that brings me back to that question I asked about the money being spent in the Department of Defense, and particularly about semiconductors and high-definition television. Now from your standpoint, do you think that this could be better managed by the National Science Foundation or by the National Institute of Standards and Technology?

Mr. BLOCH. Let me take them one by one. HDTV is certainly something which the National Science Foundation shouldn't be involved in. I think it's so far from what we are doing. HDTV is not a basic research problem. It's the implementation of existing technology, give and take a little bit. It's a marketing problem. It's a problem of finding out what the customer really wants and then aiming your forces at fulfilling that requirement. So we shouldn't have anything to do with it.

SEMATECH might be a different story, but there essentially industry has the lead. The Government is funding part of industry's effort, but industry is responsible for it, it's their people, it's their equipment, it's their facilities, it's their management that has to address that problem.

Again, you could say go put some money into the Foundation's budget for this research, but I'm not so sure that we would add any value. Again, NIST would add some value, but that comes closer to what we should be doing, but it's not quite there yet.

MERIT REVIEW

Senator GRASSLEY. Let me change directions and go to another point. In a 1981 National Academy of Sciences study called "Peer Review of the National Science Foundation," an experiment was conducted in which the National Science Foundation researched grant applications that had been previously approved or declined were reviewed a second time. In the second review, however, the identities of the applicants were altered. When the research proposals were reviewed the second time, there were significant differences in the technical reviews given the research proposals, that is, the review panel's assessment of the technical merit of the research proposals changed when the names, reputations, and institutions of the applicants were altered.

I want to ask, does this in any way suggest the existence of an old boy network in the National Science Foundation establishment? Is who you know often more important than what you know as far as the merit review process?

Mr. BLOCH. No; that doesn't suggest that at all. In fact, we are very sensitive to the accusation of the existence of an old boy network, and we have done many things to improve the peer review program. We are doing things continuously to the peer review, or merit review, program to make sure that it is as objective as you possibly can make it.

It's not unusual if you have 10 applications over here and you ask 10 people to judge them that they will sort them out in a different priority than 10 other people judging, especially when some of them are very close in terms of quality, in terms of subject matter, as well as in terms of the need for it. So that's not unusual.

Senator GRASSLEY. Then there is no basis to the finding of the report of the National Academy of Sciences, is that what you're saying?

Mr. BLOCH. Well, I'm sure the facts are the facts, but I would not conclude from the way you are describing it that there is an old boy network.

ACCOUNTABILITY IN MERIT REVIEW

Senator GRASSLEY. In 1987 the National Science Foundation apologized to a geologist who contended that in rejecting research proposals from his associates the Foundation had taken into account a false rumor that he had been an agent for the CIA. While the NSF denied that the rumor played any part in turning down the research proposals of his associates, the Foundation: (1) acknowledged that it had conveyed the rumor to the peer review panels that were considering the proposals by his associates, that the panel had considered this rumor and that some panel members indicated their views on the proposals were affected by the rumor; (2) conceded written records of the panel did not reflect that rumor had been discussed; and (3) admitted that it had passed along the allegation to other researchers even after the agency's decision had been made.

This disturbing account of the lack of accountability in the merit review process is similar to a report that I received about a National Science Foundation program manager who told a researcher in my State never to apply for funding again for reasons that had nothing to do with the technical merits of any past or future proposals.

What accountability is there in the NSF merit review system?

Mr. BLOCH. Well, there is quite a bit of accountability in the process. I am familiar with the first example that you mentioned, and I think that was an unfortunate incident in which somebody talked about a rumor in front of people or not in front of people. That is completely out of bounds, and we are making sure that that's understood by our program managers and by the people who participate in the reviews.

Senator **Grassley**. That is what I would like to have you explain then. What kind of safeguards are in place to protect the integrity of the system against rumors and threats?

Mr. **Bloch**. Well, we have an oversight procedure in place in the Foundation that is examining, on I think a 3-year cycle, the major programs in the Foundation. They are looking at the decision processes and the documentation and, by the way, the audit and oversight group has cognizance over that, and making sure that there is no bias and that the evaluations are being done in the way they should be done, that no disparaging remarks are being made, either of a personal nature or what-have-you, and that the decisions that come out of it are strictly based on what they should be based on; namely, the quality and the importance of the proposal.

Beyond that, as long as you have people involved, and we have a large number of people involved in this very cumbersome process, I think mistakes are going to be made. No doubt about it. When we find out about these mistakes, we step up to the situation. I can't promise you that mistakes are not going to be made in the future, but I promise you that we are alert to that and that we are aggressive about it, and whenever we hear about it we take action.

The second case you mentioned I think I am somewhat familiar with. I think there were two sides to that statement. It certainly was inappropriate to make that statement and I think the individual understands it.

Senator **Mikulski**. Does that clear it up for you, Senator Grassley?

Senator **Grassley**. Yes, thank you.

Senator **Mikulski**. Senator Kerrey.

SCIENTIFIC RESEARCH FOR THE NATIONAL INTEREST

Senator **Kerrey**. Mr. Bloch, I want to make it clear that I align myself with the President's enthusiasm for NSF and for the need to increase funding. However, I must also point out what I'm sure you know, and that is that there is amongst the American people in general, and certainly in Nebraska in particular, some discomfort, cynicism, and hostility at times to basic research, particularly in the effort of trying to improve technological tools.

I suggest that part of that is as a consequence of increased specialization and what it does to the capacity of human beings to be able to control their own lives. A machine breaks down and now what do you do?

Part of it has to do with there have been instances where technology applied has had, to use a euphemism, a rather nasty side effect we didn't anticipate, and now all of the sudden the world may not be better. It may be worse because we didn't apply some qualitative judgment or we didn't simply anticipate, as human beings very often don't.

The third is that there is a suspicion of wasted effort, the famous tse-tse fly that I see the Washington Post talked about this morning. It's very often trumped up by politicians as wasted effort and there is a suspicion that once a person puts on a white laboratory coat that they are essentially trying to figure out some way to waste a day. So there is, I think, the need to talk about technology in ways that people can understand.

You said at the beginning that what you are trying to do, or I believe you said you're trying to put the national interest ahead of the interest of the scientists themselves, and I assume that you don't mean that to be disparaging of the scientists' interests, but it's just that the national interest was important.

Can you describe to me a little bit how you determine or what sort of thinking goes into the determination of what is in the national interest, and I would like to give you an example, something I just simply read about and I have no idea if it has merit as something that qualifies it as a national interest.

I read that the next step for microchips as we try to increase the capacity of those chips is going to be x-ray lithography, and I assume you've got some knowledge in that sense. The article also said the IBM was the only company that had the size to be able to invest in x-ray lithography and that the Japanese had four or five companies that were doing it.

As I read it, and again I don't want to use the word "crisis" since I already know that's one of your hot buttons, but nonetheless I felt some alarm, as you do any time you read one of these articles. I don't want to divert you from using other examples, but I just tell you that opened up a question in my mind as to whether or not that would qualify as a national interest.

X-RAY LITHOGRAPHY

Mr. BLOCH. Well, x-ray lithography certainly qualifies as far as the national interest is concerned. It's the next technology in personalizing semiconductor wafers or semiconductor chips. It's a technology that is coming close to being implementable. It was not 5 years ago; you couldn't have done it. The basic principles have been around for a long time. The Japanese have taken a major lead in it.

I was in Japan last November with some of your colleagues from here and from the House. We visited a couple of government laboratories and we saw two major installations that had to do with x-ray lithography for semiconductors.

Senator KERREY. Excuse me, but within the context of NSF do you sit and think well, that's something that DARPA can work on or that's something that the National Institute of Science and Technology will do? I mean is that a mission that you see for NSF?

Mr. BLOCH. Well, we have been working in that particular area in terms of the tool itself. We have been funding over the last few years a machine out in Michigan, by the way—I'm sorry, Wisconsin, that can be used——

Senator KERREY. There is a big lake out there, by the way.

Mr. BLOCH. Yes, I know. My geography is pretty bad.

Senator MIKULSKI. You have to be geographically literate. [Laughter.]

Mr. BLOCH. That's right. So we have been working from that viewpoint. I think what you have been reading about that of late is a consternation that everybody has that industry has not stepped up to that problem. You cited IBM as being the only one. I'm not even convinced that IBM can bring that off by itself but the semiconductor industry in total has not stepped up to that problem in the same way as the Japanese industry has stepped up it.

I would say that the implementation of that technology in terms of how you use it in a manufacturing line, yes, that's more along the line of NIST or, better yet, of industry. SEMATECH, by the way, if they didn't have to get themselves off the ground in total today, probably would be the right place to put that next development for x-ray lithography, no doubt about it in my mind.

Senator KERREY. I mean you see it as something that's in the national interest and something that needs perhaps some government assistance?

Mr. BLOCH. Yes, definitely.

Senator KERREY. And you indicated that NSF is doing some work with it and you're funding some projects, one in Wisconsin and one in other areas as well?

Mr. BLOCH. I don't want to mislead you on that last point.

Senator KERREY. You can if you want to. That's all right. I wouldn't probably know the difference. [Laughter.]

Mr. BLOCH. No; I would never do that obviously. We funded some work together with the Department of Energy that gives us the know-how about how to put together an x-ray lithography machine and how to use that machine. Some of the output of that machine I'm sure is being used for semiconductor work and some is not. It's a very general purpose kind of a tool.

Senator KERREY. Does NSF have the authority to say we are going to do this project and then carry the project to completion? I mean is there a beginning and an end to this thing? I take your statement perhaps a bit too literally when you say that we're trying to put the national interest ahead of the interests of the scientists themselves.

Mr. BLOCH. That doesn't mean that we can do everything that is in the national interest that should be done.

NSF AND PRODUCT DEVELOPMENT

Senator KERREY. But you can't line a project like this up then and say there is a beginning point, the Board gets together and says this is something that is in the national interest and we're going to make a concerted effort to work with all entities of Government and with the private sector. We are going to develop a plan in which we will be the catalyst, but which also has us as the lead, as the lead authority that is in charge of the project itself?

Mr. BLOCH. I think we need to distinguish very clearly between what the Foundation is supposed to do and can do, and that is basic research and education in that particular category. Now basic research can go a long way or not a long way toward a product in the field, but I don't think we have the wherewithal, nor do we have the authority I believe, and I might be contradicted by my legal colleagues, to carry a project all the way through where you would start with basic concepts and wind up with a project on the manufacturing floor. I would think that is not our function.

NSF'S MISSION

Senator KERREY. I'm struggling with that and with the message that you gave to Senator Grassley earlier, because I hear you saying that you try to give full consideration to what you believe to be in the national interest as well as what's in the scientists' interests, and I'm struggling to get some sense of why you don't then, having identified something that is in the national interest, try to ask us, perhaps, for the authority that you need to carry the project all the way to completion.

Mr. BLOCH. Well, because I don't think that's our mission really. What I said before is, what we are doing needs to be aligned to the national interest in those areas where NSF has a mission. For instance, it might be in the national interest to solve the AIDS problem, but that's certainly not what we should be doing. It's not in our mission and we don't have the wherewithal to do it. It's in somebody else's mission, and in that case it's NIH.

Mr. GOOD. Could I make a comment, Senator Kerrey?

Senator KERREY. Sure.

Dr. GOOD. I think the problem here is that one needs to understand what happens when you commercialize something. What you're asking is how to get it to the final piece to get a commercial product on the market which is then going to be competitive with the rest of the world.

The National Science Foundation is in the business of providing the enabling technology to be able for us to do that. Industry has to pick up its piece and do the developmental kinds of research that's necessary to sell that as a product.

The issue is you've got to understand what the customer wants and you've got to understand what he's going to use it for. The National Science Foundation is in no position to provide that and should not, in my opinion, provide that. The issue then is how do you get the industry to do that, and that's a different question, and the National Science Foundation is not in a position to truly make that linkage work. They have done a lot in terms of the cooperative centers that we have and with working with the university, but industry has got to pick it up, otherwise there won't be a product and there won't be a marketing department that can sell it and determine what has to be put into it to make it go. So you've got to separate these two issues.

I understand your frustration, but they really are two different, somewhat interrelated, but very different issues.

Senator KERREY. The tone of my voice was less a consequence of frustration that I feel for what it is you're trying to do than it is me trying just to understand what it is that you do.

Mr. BLOCH. Can I just say a few words——

Senator MIKULSKI. And then we are going to really have to wrap that part of the questioning up.

Mr. BLOCH. I'll be very short. I think you should think of us as being a focus and a catalyst for generating new knowledge. I think you should look at us as being responsible for making sure that the country has an infrastructure in place, and by that I mean people and equipment and instrumentation and institutions that can do that basic kind of work. I don't think you should look at us as an implementation agency.

COLLAPSE OF THE GREEN BANK TELESCOPE

Senator **Mikulski**. I would like to ask a question about the Green Bank telescope. As you know, in November of last year the 300-foot telescope at the observatory in Green Bank, WV, collapsed. Thank God, no one was injured in that tragedy, but this incident was of course unanticipated and occurred after you submitted your budget.

When these calamities occur, what does the National Science Foundation do? Do you have any formal regulations or processes to replace a facility or an instrument?

Mr. **Bloch**. Well, Madam Chair, that was the first time, to the best of my knowledge, that the Foundation ever was confronted with an accident of this sort.

Senator **Mikulski**. Yes; that's why we're asking.

Mr. **Bloch**. It wasn't an accident so much as it was a collapse. So we have no regulations that would come into play automatically. However, what we did do is assemble a team from that discipline to make sure we understand three things: First of all, the consequences of that collapse, second, the reason for the collapse as best as you can make out, and last, what does the future hold or what must we do in the future to replace that instrument in one form or another.

Senator **Mikulski**. What would the replacement of a telescope cost? From what I understand, this is a unique facility dedicated to radio astronomy. What is the scientific merit to replacing this telescope, do you need to replace it and what would its cost be?

Mr. **Bloch**. Well, the cost is approximately between $70 and $80 million or thereabouts. These are becoming very expensive kinds of instruments. The original cost was a fraction of that.

Obviously radio astronomy is a very important kind of a science. The whole Green Bank site is devoted to it and, by the way, it's a radio-free zone and certainly the only one we have in this country, and it might be the only one in the world for that matter. So it's very important that we keep it in that mode of operation and also that we make available to the community the resources and the capabilities of performing that kind of research.

ANTARCTIC ICEBREAKER PROCUREMENT

Senator **Mikulski**. Thank you. I would like to talk a little bit about the Antarctic programs for a few minutes. I think we are all committed to the Antarctic project. I was very much interested in hearing how you contained the oilspill. As you know, oilspills in international waters and national waters are very headline gripping these days.

But what I would like to focus on for the purposes of our appropriation hearing is the Antarctic icebreaker procurement issue. From what I understand, the budget request states that $4.2 million is to be used to finance the chartering of a new research icebreaking ship. There is a lot of controversy about that, and last year the conferees added a Buy American provision to this with my strong support.

Could you tell me what is the status of this procurement and how much do you anticipate to be the cost to the Foundation of the new ship?

Mr. BLOCH. We issued an RFP in February of this year. This was an RFP that was issued taking into consideration what the 1989 appropriation bill specified for us.

Proposals are due in May of this year and, depending on the review of the proposals, we hope that we can have a contract in place by the end of this year. So we are in the beginning of that cycle of getting proposals and evaluating proposals and placing a contract.

Senator MIKULSKI. One of the things in talking about the Buy American provision, I believe the spirit of congressional action was to require that NSF build into the cost of any non-U.S. proposal the subsidies sometimes up front and sometimes hidden which foreign countries provide their shipping and ship building industries. Is that being followed in the procurement process?

Mr. BLOCH. Well, that certainly will be followed in the evaluation of the proposals that we receive. We have been in touch with the Department of Commerce to find out exactly what that means and how to go about getting that information. All of the bidders know that that is a condition for evaluation, and they were asked to submit to us supporting data on that.

So, yes, we are following both the principle laid down in the appropriation bill as well as the spirit in which it was written.

Senator MIKULSKI. So you'll be looking at things like preference for steel, tax benefits, export credits, wage rates, and quality control?

Mr. BLOCH. Anything that has a subsidy involved in it, yes.

VESSEL SAFETY STANDARDS

Senator MIKULSKI. Now I would also like to talk about vessel safety standards. Your contractor, IT&T, has said that U.S. shipping safety standards shouldn't have to apply to all proposals submitted for this procurement because the icebreaker won't technically be a Government vessel because it's essentially a contract.

Isn't it true that even if you lease this ship rather than buy it, and I know you are deciding whether to lease or buy, NSF will end up paying for construction of the vessel and, therefore, should comply with those safety standards, isn't that so?

Mr. BLOCH. Well, we certainly want to make sure that this is as safe a ship as any. I have seen the correspondence between IT&T and some of the people that inquired, and you should know that we have been in contact with IT&T to make sure that they are more responsive to the inquiries that they are getting. I think some of the responses were legalistic. Now that's probably always true between two lawyers, one in a private firm and one in a law firm, but I think it was much too legalistic, and again the spirit of our procurement is that we get a safe ship that could be registered anywhere and would be acceptable anywhere.

Senator **Mikulski**. And we are going to count on you to follow that because I know that's your commitment.

Mr. **Bloch**. We will.

Senator **Mikulski**. It's interesting, the reason we're so firm on these subsidy issues is that there are only a couple of countries in the world that build icebreakers, and there are only a couple of countries that need to build them, one of which is our new found friend, Mr. Gorbachev and the Soviet Union. I think they build something like 50, 60 or 70 of them a year. Now they have a kind of subsidy program that we don't have, and of course who knows with glasnost and perestroika, and I understand the Soviet Embassy has asked for reports on the Voelker Commission on Civil Service. [Laughter.]

But what we are being sure of is that the American shipping interests are able to compete on a level playing field, and I appreciate exactly what you said, that we don't get legalistic and technical and so on and we keep to the spirit.

Mr. **Bloch**. Well, technical terms we should evaluate, but not legal terms.

NSF'S AFFIRMATIVE ACTION PLAN

Senator **Mikulski**. That's right, in terms of, perhaps, justice.

Now I have two last questions that come back now really more to the National Science Foundation.

In your program, and this will go to the hiring of women and minorities, in your own development of women in engineering and grants to minority schools, historically black colleges and so on, you're talking a leap perhaps that very few Government agencies are, but then I feel that we need to be model employers and practice what we preach. So, therefore, I would like to ask you a few questions about the hiring of women and minorities.

Last year you told us that only 26 percent of your employees at a GS-12 and above were women. That was up from 1.4 percent of the previous year. What is the percentage of women in senior GS and SES positions within the agency today?

Mr. **Bloch**. Well, I think what you see today, first of all, you asked for minorities and women I think.

Senator **Mikulski**. Well, we'll come back to people of color in a minute. Let's stick to women.

Mr. **Bloch**. The percent of the staff that is female increased by about 1 percent between 1987 and 1988, from about 56 percent to 57 percent. It's pretty well spread throughout the Foundation, except it's probably not as well spread as it should be at the higher levels of management, even though you see one example here and——

Senator **Mikulski**. Well, that's why I'm asking the question.

Mr. **Bloch**. We have made a concerted effort to make that happen. It's a difficult thing to accomplish obviously, but we have good employees that we are bringing along, and I think over time will make out very well in this area.

Senator **Mikulski**. Now why is it difficult?

Mr. **Bloch**. It's difficult because we probably haven't put the focus on it in the past. That is how I would answer it.

Senator MIKULSKI. So it's not difficult, but it's just that it hasn't been focused on.

Mr. BLOCH. Yes, and don't forget, I mean to get to a position like Controller of the Foundation, you don't take somebody right out of school.

Senator MIKULSKI. No; but you can take them out of other places.

Mr. BLOCH. Well, that's very true, and I think you will see an example in the next few days where we are doing that. I'd rather not say right now what it is and where it is.

Senator MIKULSKI. Well, we would hope, because I intend to chair this subcommittee a long time, to very carefully measure this progress.

Mr. BLOCH. I'm sure you will. We are dedicated to making sure that happens. I think we have made progress both at the Division Director's level as well as at the Office Head and at the Assistant Director's level.

The other problem that you should understand is that we are trying to attract women as well as minorities from universities to come into the Foundation for 1 or 2 years as a rotator, and it's very difficult to do that. It's very difficult because other alternatives are available to women and minorities. The interruption of their career paths in the institutions that they are at is not an easy thing to accomplish. So there's a limited kind of a success there.

MINORITY EMPLOYMENT AT NSF

Senator MIKULSKI. Your record for minority employment has even been lower than that for women. Your report as of last year's hearing, only a 1.2-percent growth in the hiring of minority employees for a total percentage of 12.6 percent of your work force. And, as we know, the work force of the year 2000 will be women, minorities and new immigrants. What is your percentage this year, and what steps are you taking to hire minority candidates?

Mr. BLOCH. The total employment of minorities is about 38 percent, by the way.

Senator MIKULSKI. I'm sorry.

Mr. BLOCH. The total minority employment of the Foundation is—

Senator MIKULSKI. For GS-12 and above.

Mr. BLOCH. For GS-12 it's about 12 percent, 12.6 percent, an increase of about 1.2 percent to 13.8 percent in the last year. So we have made progress there.

Where you don't find many minorities is at the SES level. That's where we have that problem. So you see GS-12 is not that bad, it's not as good as the lower level, but for the total Foundation I think it's pretty good.

Senator MIKULSKI. Well, you know, this is an issue that is very disturbing to me, and it's very disturbing to me throughout my entire subcommittee. I went over to the National Space Agency and then went out and toured space facilities. Quite frankly, you would not believe that there were Afro-Americans in this country. That really bothered me, and it bothered me a great deal.

Then there is always the two women, the one who might have the Ph.D. in astrophysics that they trot out to shake my hand, and I'm supposed to feel that's terrific. I don't feel that's terrific.

I went over to EPA. In my subcommittee's allocation, all those agencies that I have responsibility for, the only time that I see a demographic profile when I walk into a room that in any way looks like the rest of America is when I'm over at HUD.

Mr. Bloch. When you were over at——

Senator Mikulski. HUD, Housing and Urban Development. Now what we are talking about here is maybe not the scientific skill in astrophysics, but we are talking about managers and financial people and so on, and they seem to have them in these other agencies. We know that historically women and minorities have gravitated to certain agencies because that's where some of the initial recruitment was. That recruitment was begun under Lyndon Johnson. Lyndon Johnson was the first to really open up the door of the Federal Government and move it into a more aggressive area in terms of employment. We see that at HHS, we see it in my own State in the Social Security Administration, and so on, but we sure don't see it in many other places in the Federal Government.

Mr. Bloch. Well, let me assure you that that issue has been the focus of my very personal efforts since I have been in the Foundation, and we are attacking that at many different levels. We are attacking it at the level of our own employment as well as in making sure that minorities are being considered and are being given the right programs in terms of attracting them to science and engineering as well as continuing their studies toward a Ph.D. degree or an MS degree. So we have many programs in the Foundation that are focusing on that problem.

I think what you see at least in the professional ranks of the Foundation represented is what goes on in the rest of the country where the participation of minorities in the sciences and in engineering is not as high as it should be, and it's not increasing very fast. This is one of our frustrations and that is why we have some of the programs that we have in place today—to make that happen.

Senator Mikulski. Well, you can just turn around and look.

Mr. Bloch. I don't have to turn around. I see it on your face.

NSF'S RELOCATION

Senator Mikulski. I mean it doesn't exactly look like a United Fund poster of our community.

Let's wrap up today by talking about the National Science Foundation relocation. The agency is requesting an increase for rent. You need to move. What is the status of your agency's proposed relocation and what specific steps in this process are you taking to reduce the rental cost?

Mr. Bloch. Well, we just went out 10 days ago with a solicitation for an office; that has been issued. The response is due on June 7, 1989. We will evaluate the responses between July and October and, hopefully, have an award recommendation and congressional notification by the beginning of the year if the returns from this solicitation are acceptable. As you know, the solicitation is open to the whole metropolitan area and not just the District, and we hope that we get a good response.

Senator **Mikulski**. I'm very pleased that you're making sure that it's open to the whole metropolitan area. My concern is, of course, that the process be fair and competitive at the lowest possible cost to the taxpayer. One of your criteria is that any new headquarters be 2,000 feet from a Metro stop. If you don't need your new building until 1992, does that mean that sites with subway stops currently under construction to be completed by 1992 will be considered equally with those sites that have subways stops?

Mr. **Bloch**. I would think so if the 1992 date for these Metro stops is reasonable. I would like, however, to provide the precise agreement we have reached with GSA for the record.

[The information follows:]

LETTER FROM JEFF FENSTERMACHER, ASSISTANT DIRECTOR, NATIONAL SCIENCE FOUNDATION

May 1, 1989.

Mr. Richard Hadsell,
Regional Administrator, General Services Administration, 7th and D Streets, SW, Washington, DC.

Dear Dick: The purpose of this letter is to clarify the requirement in NSF's Solicitation for Offers, SFO #89-048, regarding proximity to a Metrorail station.

As you know, our Solicitation specifies that the site must be "within 2,000 walkable linear feet from an existing operational Metrorail station." The issue which was raised at our recent Senate Appropriations Hearings is: at what point in time must a Metrorail station be operational in order to meet this requirement?

Based on my recent discussions with Paul Chistolini and yourself, it is my understanding that the Evaluation Panel will consider sites at any Metrorail station that is fully funded and scheduled to be in operation at the beginning of NSF's phased occupancy of the new facility.

I would appreciate your concurrence below if our understanding of the Metrorail requirement is correct so we can inform the Senate Appropriations Committee staff.

Thanks in advance for your help.

Sincerely,

Jeff Fenstermacher,
Assistant Director.

LINKING FEDERAL DOLLARS AND NATIONAL SERVICE

Senator **Mikulski**. I understand.

We're going to wrap up today. Two hours plus is a vigorous hearing, and we thank you for the candid way in which you answered so many of the questions. We have covered a lot of ground, and I think we're lucky to have you in government.

I know that one of the problems is recruitment and retention and people certainly at your own senior executive core. So as we go through these questions, it's not because we are dissatisfied or cantankerous, but it's that we're really trying to dig in rather than to dig out, and I want you to know that.

As we look at funding and maybe the awarding of grants, maybe we have to think in terms of ways of, in addition to scientific merit, coming back to affirmative action and getting people in the classroom out there doing Saturday scholar programs or those kinds of things, and maybe in order to get a threshold to even competing for research dollars is what they are doing to help themselves and help their community.

Mr. BLOCH. I think that is a very good suggestion, and I think we'll take that into account.

INSTITUTIONAL COMMITMENT TO UNDERGRADUATES

Senator MIKULSKI. You might think it's good. I know it's controversial. I know it's highly controversial. I get a chance to talk to a lot of young people because of my interest in national service, and it's interesting the way they perceive educational establishments and the help that they are given. One of course is tuition and to be able to go to school in the first place, and there is a tremendous interest in community service as a way of reducing student debt, at least my idea as compared to somebody else's. I'm not going to try to draw you into that, but what they feel is often that their very institutions are not on their side and not committed to them and to helping them learn.

Mr. BLOCH. Can I just comment on that last point and then on another one you skipped over very rapidly.

For that last reason you mentioned, that the institutions are not being perceived to be on their side, I had a group of university presidents together—about 20 of them were selected because they got the most dollars from the National Science Foundation—on exactly the issue of minorities and women both in their faculty as well as in their administration and in their student body to make sure that they understand our desire to increase that and that we need to help each other in making that happen. I was encouraged by the response that we got and the receptiveness to that issue.

The second thing I wanted to mention is that I wanted to thank you for your leadership in the Federal salary issue. It's a very important issue, because I think we need to attract the right people and we need to attract people that can help us in the discharge of our responsibility. I think the gap today between university and Federal salary, and especially between the industry and the Federal salary, is increasing rather than staying constant.

FEDERAL SALARY ISSUE

Senator MIKULSKI. Well, I believe the retention of our people is an absolute crisis. I know you don't like that word, but I think that is. That's No. 1.

I think everyone was stung by the rather tart and cryptic comments about our Federal work force during the recent pay raise debate. It wasn't a debate. It wasn't a debate at all. I thought the comments made on some of those radio talk shows were not only unnecessary, but the stinging quality I thought was absolutely devastating.

Mr. BLOCH. By the way, it was also unfair, the comments were unfair.

Senator MIKULSKI. Well, it was unfair and it was untrue and it was ugly, and they had a good time doing it.

I have, as you know, the good fortune of representing what I call many of the Federal jewels. The National Bureau of Standards that Senator Grassley talked about, NIH, Goddard as well as Social Security, HCVA and the National Security Agency are in Maryland, all of which, each one, whether we are talking about the word processor or the senior executive service core, we're talking about people who are out there doing a lot.

So retention is one, it's very difficult to recruit and then I don't think, and this is one of the things we hope in Treasury/Post Office to take up with OPM, there is also the ability to recycle your employees up, where you've got good employees that are in other ranks or someone where you would have the opportunity as an employer to upgrade them, where someone might come into the agency at one level to be able to move to another level or even maybe a new field with some help from the Federal Government.

So we feel very strongly about the civil service work force issue. I'm glad the Soviet Embassy is reading it, and we hope our friends read it down on Pennsylvania Avenue. If the Soviets read it, I want Sununu to read it, too. [Laughter.]

SUBCOMMITTEE RECESS

This subcommittee stands in recess until tomorrow morning at 10 o'clock.

[Whereupon, at 3:50 p.m., Monday, April 3, the subcommittee was recessed, to reconvene at 10 a.m., Tuesday, April 4.]

VA, HUD, AND INDEPENDENT AGENCIES APPROPRIATIONS FOR FISCAL YEAR 1990

TUESDAY, APRIL 4, 1989

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 10 a.m., in room SD-116, Dirksen Senate Office Building, Hon. J. Robert Kerrey presiding.

Present: Senators Mikulski, Grassley, and Kerrey

NATIONAL SCIENCE FOUNDATION

STATEMENT OF ERICH BLOCH, DIRECTOR

ACCOMPANIED BY:
SANDRA TOYE, CONTROLLER
JOHN MOORE, DEPUTY DIRECTOR

OPENING REMARKS OF SENATOR KERREY

Senator **KERREY**. The subcommittee will come to order.

Today, as we did yesterday, the committee will continue its review of the National Science Foundation's 1990 budget.

Mr. Bloch, you told us yesterday that the Foundation is asking for a 14-percent increase in fiscal year 1990, a figure which will be tough to achieve because of this year's Gramm-Rudman-Hollings deficit reduction target.

Before we get into some of my questions and some of Senator Mikulski's questions that she asked me to present, I would just like to ask you, Mr. Bloch, if there is anything additional that you would like to comment on from yesterday?

Mr. **BLOCH**. No; I don't think so. I think we cleared up yesterday's questions pretty well. I would have a statement, if I am permitted, at the end of the hearing.

SCIENTIFIC MISCONDUCT

Senator **KERREY**. Let me begin with a question that was raised yesterday again by Senator Mikulski, and it is one of some interest to me, but it's one that is primarily of interest to her, and that is the issue of scientific misconduct and fraud that has been getting increased public attention.

And I would parenthetically point out that it has been added to the list of three things that I referenced yesterday that cause people not to have the support or give the support to basic research, and it's for that reason that it's a concern and I'm sure a concern as well just from the standpoint of trying to be accountable to the taxpayers of what we are doing.

Much of this attention has been in biomedical, and, therefore, involves the National Institutes of Health. The question then is, what has the Foundation done to guard against the apparent increasing frequency of scientific misconduct?

Mr. BLOCH. Thank you for the question. It's a very important one and I realize that it has gotten a lot of press of late, and as you said, it's primarily in the medical sciences areas and not in the ones that we are concerned with.

However, we are taking the issue very seriously. We put out a regulation last year for comment in the Federal Register or actually in July 1987. They are intentionally drafted to be very similar to the NIH draft regulation. And I can tell you that contrary to what happened at NIH, the regulations are in effect today. So we have a set of regulations and we have put the community on notice that we are taking it very seriously.

We are in the process of putting out a letter to all university presidents and college presidents where we are essentially outlining not only what our positions are, but what we are expecting of the academic community.

We have our focus on misconduct, as you mentioned, but in addition, there is a related subject which is called openness, openness in communication. That is, not withholding information for any length of time, sharing the results of research with one's colleagues and peers, and making available samples that were developed under Federal funding to other researchers.

I think the focus that we have on the misconduct regulation that is the first instance of investigation has to be the university itself; that is, to give them the first opportunity to deal with the matter. There are two stages in that. The first one is an inquiry to determine if investigation is warranted, and the second one is a formal investigation if warranted.

NSF is being informed after each stage of the final outcome, and we are reserving the right to conduct our own investigation at any time and not just depend on the results of a university's or a college's own investigation. So I think we have the situation well covered.

I should tell you that in the last couple of years we had about six cases, three of which are completed. I would just add these cases seem to be of a minor nature.

Senator KERREY. So basically what you're saying is that you're asking the institutions, the grantees, to be responsible for protecting——

Mr. BLOCH. Only as the first instance, and we reserve the right to interfere any time with their investigation, and that we can mount our own. In the end we have the last say in the matter. If we don't like what we see, how it was investigated and what was investigated, we can mount our own. So yes.

AUDITING OF GRANTS

Senator KERREY. I don't remember the number, but don't you have 22,000 or something like that, grants, or 16,000 a year.

Mr. Bloch. Right, and over the last 2 years we had about six cases that were, I'll say, not major. So it's not a big item with us.

Senator Kerrey. And 21 auditors?

Mr. Bloch. Twenty-one people in the auditing area.

Senator Kerrey. If I understand the dilemma, the dilemma seems to me to be that let's say you put 1,000 auditors in place and that becomes the primary job of NSF, and you're going to come to the committee and to the Congress and to the people and say there is no fraud at all, we have eliminated all of it.

Mr. Bloch. Mr. Chairman, don't forget what I mentioned yesterday, and I probably didn't get my point across very clearly.

Senator Kerrey. I may have forgotten more than just that yesterday. [Laughter.]

Mr. Bloch. I doubt that. But besides the fact that we have our own audit team, we are contracting with HHS for the majority of our audits. If you look at our total expenditure in that area, it's about $2.5 to $3 million. You compare that to NASA, with a larger budget, and yesterday the number of about eight was mentioned. So probably we have about the right ratio. We are not just depending on these 11 auditors.

Dr. Moore. I would just make one comment. While we have a lot of grants, individual awards, we deal with about 500, roughly speaking, institutions. Almost all our awards are made to institutions formally, and our audits are of the institutions themselves and what is going on in those institutions and what is going on with the awards that they receive.

So I think the scale of the task is a little bit misrepresented by counting the number of awards. I think it's more accurate to look at the number of institutions with which we are dealing. If you take 500 and compare that to the number of auditors or the number of people in our audit staff, the job takes on a different order of magnitude, I think.

Mr. Bloch. You know, Senator, like everything else, I think we have to depend on the community and we have to depend on the institutions as a first line of defense or otherwise we'll have an impossible task, and only if that fails—and I think we have a good system in place that would give us a signal that something went wrong, do we step in.

Senator Kerrey. Basically what we're talking about here, by the way, is a regulatory function, and I appreciate how difficult it is to do it and provide an environment essentially as an attitude of freedom that enables the researchers to do their job.

I mean I'm not suggesting that you convert NSF into the FBI, but I am suggesting that, particularly with biomedical research, I mean I think Senator Mikulski's question is on target there where it's something as sensitive as that. It has a tendency to reinforce in the public's mind that we shouldn't be doing basic research.

I mean I'm not looking for an answer here that is air tight. I'm just looking to make sure that I express to you I think an attitude that ought to be factored into the awarding of the grants, and particularly in biomedical.

Mr. Bloch. Absolutely. Look, I assure you we are alert to the problem. No. 1, we are taking the problem seriously, we have the regulations out there in effect today, we can operate with those as an underpinning and we are pursuing the cases in a very diligent kind of a way. In addition, we are glad to report to you once a year or twice a year, whatever you prefer, what we have encountered and also how we disposed of the various cases.

Senator KERREY. Well, let me follow the question that I don't have written down here. I have a couple that again Senator Mikulski would like to have me ask, and I'll get to those.

COORDINATION OF RESEARCH

In the testimony yesterday, I still have some sort of sinking concern that we are not being as aggressive as we ought to in outlining for the American people the purpose and the object of research itself. And I know there are all kinds of territorial squabbles that are there, and some of them far more than just squabbles.

I mean I participated in the creation of a thing called the Midwest Technology Development Institute that was essentially States attempting to cooperate in not only the determination of what we are going to do with our research dollars, but how we were going to share that research information, and I think very importantly how we were going to make determinations about the moment when we had to decide whether or not to sell it.

It started from Bill Norris with Control Data. He was and still is very much concerned about the selling of technology too cheaply, and he felt that particularly foreign nationals were coming in here and buying American technology too cheap. I don't want to spend too much time on that, but I understand having done that that there is great institutional resistance to coordination of research.

They don't like to give up the authority that they've got now, and they can say to politicians like me we'll just wait you out, and with MTDI they did, in fact, wait us out. So it's extremely difficult. I mean I know you cannot be tinted with these institutions.

But I'm concerned not only for strategic and economic reasons, but also just from the standpoint of maintaining the excitement around research itself that unless we are aggressive in fighting at the Federal level the battles between you and Commerce and Defense and other bureaucracies that are doing research, unless we just sit on the table and fight those battles, it's going to be awfully difficult for us to get to, I think, very important battles at the State level where an awful lot of this research is being done.

I mean the mission of NSF as a catalyst, it seems to me, needs to be pushed a bit. I would like to see NSF be a bit more than a catalyst. NSF is an organization that is trusted, you may be comforted to know. It is an organization that has the trust of the people, and I would like to see NSF be far more than just a catalyst, personally.

I've just got to tell you that I'm very pleased, not only with the President's support for basic research, but his selection of a science adviser, and I've read the Science Adviser's testimony that will follow. It is strong in its commitment to research, which is difficult to support, but I would like to see NSF be far more than just a catalyst and I would like to get you to challenge whether or not I'm right or wrong.

ROLE IN COORDINATING RESEARCH

Mr. **Bloch**. Well, I won't challenge you at all, but I want to comment on a number of your topics. Let me start with the last point.

Over the last few years we have been, I think, aggressive and diligent in making sure that we bring these various sectors of our society closer together, and by the various sectors I mean the government, or governments plural, including the States, industry and the universities. We've made major changes in the universities by pushing certain programs.

The center programs was not accepted by everybody in universities. It meant the cooperation between academic groups and people in industry. It meant the cooperation with the Government, and we have done that. I think that's more than just a catalyst. That's a catalyst, but it's also putting the money on the table so that something can get done.

By the way, I should tell you that I'm kind of encouraged. I see signals and signs that tell me that this cooperation between the various sectors has improved, tremendously improved. There is a lot more cooperation than there was 5, 7 or even 8 years ago.

So I think we have done that and we have done it in a number of programs. You can't do it on an individual $25,000 grant, but you certainly can do it in the major programs.

The second point you mentioned is the battle between agencies. I really don't see that as a battle between agencies. Yes, many times you wish that the agencies would pull closer together and do some things more jointly, but I don't think it's a battle. I think it's maybe more of a separation than there should be.

By the way, the Science Adviser has the wherewithal or should have the wherewithal, and with the President's suggestions of a change in his or her status, maybe that is going to happen. I hope that is going to happen. So maybe there is more of a push from that end than we have seen in the past.

INTELLECTUAL PROPERTY RIGHTS

Your point on intellectual properties and their disposition—that is, people buy it and are we giving it away too cheap—let me assure you that the last administration as well as this administration has focused on that problem. We are asking of our trading partners a quid pro quo. We asked it of the Japanese and we are going to ask it of the Europeans once they get started on the 1992 activities that are to be supported jointly between the various countries. We have a quid pro quo with most, if not all, of the European countries, and we are insisting on a quid pro quo with the Soviets starting over and starting anew in an interchange of information.

So this focus on intellectual property and keeping it where it should be kept or giving it away only if there is something flowing into the country from the other side, I think that's foremost on people's minds today. I agree with you that for 2 or 3 years that wasn't the case.

I know Bill Norris very well, I've talked to him at length about that subject, I know his attitudes about it and philosophically I agree with him, sometimes I don't agree with his programs, but that's OK.

John, you're an expert on that.

Dr. MOORE. I wanted to make just one remark on the catalyst point. You know, NSF is responsible for about 25 percent of all Federal funding for academic basic research, and I think that fact alone shows that we are playing more than a catalytic role. It's a major role in creating the knowledge base and the human resources that the Nation requires in these times, and I think just the sheer magnitude of that, even though the dollar amounts look small compared to DOD's R&D budget, the focus of that money is really critical to what is going on in the generation of new scientific knowledge in the United States.

I would certainly agree with what Erich said about intellectual property. It's tied very closely to a point that he made earlier about openness in scientific communication, and I see those as two sides almost of the same coin. In order to make it possible to have open communication of scientific knowledge, new knowledge that is created, there must be a mutually satisfactory regime of intellectual property rights internationally or people will not be willing to exchange that knowledge. So those two things go together, and I think it's extremely important for that reason, as well as for the reason that we don't give away our technology, that we emphasize the development of strong intellectual property regimes.

ALLOCATION OF RESOURCES AND NATIONAL PRIORITIES

Senator KERREY. I guess what I'm looking for, to follow on it a bit, is somewhat similar to a rather long but I think a good essay that Herb Stein just did on "Managing a $5 Trillion Economy." He tries, and I think gets the job done for the most part, is to suggest that what we ought to be doing, rather than simply looking at the budget itself, is looking at the overall economy and asking questions about how much we want to extract from the economy for a variety of different functions.

One of the things that the essay rests upon, and I happen to agree with the premise, is that there are times when representative democracy does a pretty lousy job of allocating resources. It just does. I mean you've got some functional requirements that make it difficult for it doing anything other than that, and I'll give you a very good example.

I mean I see in your own testimony that you've highlighted for the national interest some things that are currently on everybody's sort of hot list, but I'll guarantee you that at every university throughout the country people are looking at biodiversity and the environment because everybody is interested in it all of the sudden. Maybe it is in the national interest. I don't know. But democracy tends to drive the investments according to what's currently of interest.

What I'm looking for, and I'm not suggesting again that it needs to be here this morning in order to satisfy me to support the budget increase because I intend to do that, I intend to support the President's request and I think it's desperately needed, but what I'm looking for is some sort of coherent, and I stress that word, picture of research in the United States so we can begin to say what's our tax policy doing to private research and what is the relationship between private and public research and what is the real coordination of public research, and what is, again to use my neck of the woods, what is the University of Nebraska and Iowa State in Iowa, what are they actually doing to coordinate their research, not just to talk about it and not just a conference to satisfy the elected politicians, but what are they actually doing to coordinate the research and how are they using communication technology to advance the distribution of information.

Your presentation I think is very good, and it gives on a certain level the kind of information I'm looking for. When I say NSF beyond just a catalyst, I don't mean to suggest that you aren't leading in many ways the way research is being done, but I'm just looking for a little bit of different level.

I would recommend, by the way, having no interest at all in getting no honoraria or royalties from his book, I would recommend Herb Stein's book on "Managing a $5 Trillion Economy" because it does lay what I'm trying to come to out rather well.

Mr. BLOCH. Can I just—and I know you want to move on to another question—conclude with a couple of points on that.

First of all, you know, you're talking about coordination. This is a large country and has a large number of institutions, not just universities, of which 3,000 that are doing research of one sort or another. The R&D budget of the Federal Government is split among 12 or maybe even more of your committees, and this happens to be one of them. Therefore, talking about coordination is a very, very difficult thing.

We have been focusing on cooperation and making sure that in those areas that we are responsible for in education, in human resources, in basic research, in engineering, in science, in computers, in materials, and in biotechnology that we have programs that bring some of these actors—not all of them because we can't get our hands around all of the actors—together and do things together, not only for leveraging, but also it's an easy way of transferring technology.

My second point is, I'm very encouraged about this conversation because I'm pretty sure 5 or 10 years ago whoever sat in that chair wouldn't have entertained that conversation. Basic research was something that had no bearing on their current life. Today, I think that we recognize that it has a big bearing on our economic competitiveness and I think that's a good change.

Senator KERREY. We'll get back into the list of questions here.

BUDGET PROJECTIONS

If you receive the full request in fiscal 1990, the full appropriations request for fiscal 1990, what do you project your total budget will be in each of the next three fiscal years, 1991, 1992, and 1993 and, in addition, just as sort of a supplement to that, could you provide for the record how these projections break down by appropriation account and by major activities in each of the accounts.

Mr. BLOCH. Yes, we'll provide that for the record, but in summary what you see reflected in our 1990 budget, just like you saw it reflected in our 1989 budget, is essentially the doubling over 5 years. The President in his quest for excellence message to Congress made the point that he is subscribing to that doubling, which was started in the last administration and is continuing.

So what you are going to see over the next 2 or 3 years is exactly that, the doubling of the Foundation's budget that we are coming forward with. You should know that we are behind schedule today because in 1989, we did not get our full request for that year. We got roughly 10 percent, or 9.5 percent of the 17 percent that we asked, and I hope we will fare better this year.

[The information follows:]

FUNDING ESTIMATES FOR MAJOR ACTIVITIES—FISCAL YEARS 1990–93

[In thousands of dollars]

Activity	Fiscal year—			
	1990 estimate	1991 estimate	1992 estimate	1993 estimate
Biological, behavioral, and social science	314,500	351,000	399,000	454,000
Computer and information science and engineering	191,200	213,000	242,000	275,000
Engineering	211,200	236,000	268,000	305,000
Geosciences	341,300	381,000	433,000	492,000
Mathematical and physical sciences	553,500	618,000	702,000	798,000
Program development and management	104,000	111,900	120,000	129,000
Science and technology centers	20,000	[1] 22,000	[1] 25,000	[1] 25,000
Scientific, technological and international affairs	67,322	75,000	85,000	97,000
Subtotal, research and related	1,803,022	2,008,000	2,274,000	2,575,000
Science and engineering education	190,000	201,000	213,000	225,000
U.S. Antarctic program	156,000	179,000	190,000	114,000
Total NSF	2,149,022	2,388,000	2,677,000	3,014,000

[1] Represents second, third, and fourth year funding of new awards to be made in 1990.

PRIORITIES

Senator KERREY. Let me just follow on that because the next question is here. I know the Foundation has got a 5-year strategic plan and that last year you got 168 of 333. How do you adjust your plan off of that?

Mr. BLOCH. Well, obviously we had to adjust the plan accordingly. We kept in place pretty much the priorities that we had in our full request, but we scaled down many of the efforts, not all of them. We didn't just proportionally scale things down. We protected the programs that we asked for in minority and women programs. We protected the programs in mathematics, which has been high on our agenda because it was a neglected kind of an area. We cut back the centers from about $32 to $25 million.

By the way, we had some other problems because there were some floors that Congress asked us to observe and that reduced some of the available dollars even further. We protected undergraduate education.

Senator KERREY. But no change in the priorities. I mean you basically leave the priorities intact.

Mr. BLOCH. We left the priorities pretty much intact.

Senator KERREY. You say pretty much. I mean is there an adjustment there at all of the priorities?

Mr. BLOCH. I would say no.

Senator **Kerrey**. $160 million approximately reduction in what you requested, and that's a pretty big piece.

Mr. **Bloch**. We still kept the same priorities. As I said, we scaled back certain programs and we protected other programs. That's doesn't change the priority.

We did a variance study before and after. I mean the request versus actual, and we would be glad to supply that for the record.

Senator **Kerrey**. A written adjustment to the plan.

Mr. **Bloch**. Yes; and we would be glad to supply it for the record and you can look at it yourself.

[The information follows:]

NATIONAL SCIENCE FOUNDATION

TABLE 1

FY 1989 NOA CURRENT PLAN

BY PROGRAM ACTIVITY
(In Thousands of Dollars)

PROGRAM ACTIVITY	FY 1988 CURRENT PLAN	BUDGET REQUEST	FY 1989 NOA CURRENT PLAN
Biological, Behavioral, and Social Sciences	$265,958	$288,737	$280,318
Computer and Information Science and Engineering	123,918	149,126	146,472
Engineering	171,478	194,964	187,798
Geosciences	291,340	320,876	310,112
Mathematical and Physical Sciences	473,044	502,761	492,430
Program Development and Management	84,480	95,550	90,550
Science and Technology Centers	0	30,000	25,000
Scientific, Technological, and International Affairs	44,047	50,986	50,320
Subtotal, Research and Related Activities	1,454,265	1,633,000	1,583,000
Science and Engineering Education	139,261	156,000	171,000
U.S. Antarctic Program	124,802	141,000	131,000
Total, National Science Foundation	$1,718,328	$1,930,000	$1,885,000

NATIONAL SCIENCE FOUNDATION TABLE 2

FY 1989 NOA CURRENT PLAN

BY PROGRAM ACTIVITY
(In Thousands of Dollars)

	FY 1988 CURRENT PLAN	BUDGET REQUEST	FY 1989 NOA CURRENT PLAN
BIOLOGICAL, BEHAVIORAL, AND SOCIAL SCIENCES			
Molecular Biosciences	$44,595	$48,340	$47,174
Cellular Biosciences	54,240	57,600	56,211
Biotic Systems and Resources	59,045	65,287	63,712
Behavioral and Neural Sciences	43,779	46,600	45,378
Social and Economic Science	30,150	32,690	31,250
Instrumentation and Resources	34,149	38,420	36,593
TOTAL, BBS	265,958	288,737	280,318
COMPUTER AND INFORMATION SCIENCE AND ENGINEERING			
Computer and Computation Research	19,950	22,300	21,251
Information, Robotics and Intelligent Systems	17,810	19,850	19,210
Microelectronic Information Processing Systems	13,235	16,000	15,035
Advanced Scientific Computing	44,335	55,800	55,800
Networking and Communications Research and Infrastructure	11,553	17,676	17,676
Cross-Disciplinary Activities	17,035	17,500	17,500
TOTAL, CISE	123,918	149,126	146,472
ENGINEERING			
Chemical, Biochemical, and Thermal Engineering	28,900	31,900	30,700
Mechanics, Structures, and Materials Engineering	25,780	29,050	27,570
Electrical, Communications, and Systems Engineering	23,380	25,280	25,210
Design, Manufacturing, and Computer-Integrated Engineering	15,387	17,677	16,790
Emerging Engineering Technologies	16,590	19,440	18,460
Critical Engineering Systems	25,110	28,260	27,390
Cross-Disciplinary Research	36,331	43,357	41,678
TOTAL, ENG	171,478	194,964	187,798
GEOSCIENCES			
Atmospheric Sciences	96,328	104,250	98,961
Earth Sciences	51,290	59,270	54,290
Ocean Sciences	135,381	146,520	146,520
Arctic Research Program	8,341	10,836	10,341
TOTAL, GEO	291,340	320,876	310,112

NATIONAL SCIENCE FOUNDATION

FY 1989 NOA CURRENT PLAN

BY PROGRAM ACTIVITY
(In Thousands of Dollars)

	FY 1988 CURRENT PLAN	BUDGET REQUEST	FY 1989 NOA CURRENT PLAN
MATHEMATICAL AND PHYSICAL SCIENCES			
Mathematical Sciences	63,670	67,970	66,240
Astronomical Sciences	86,022	90,040	90,040
Physics	118,210	126,710	123,290
Chemistry	94,272	99,171	97,210
Materials Research	110,870	118,870	115,650
TOTAL, MPS	473,044	502,761	492,430
PROGRAM DEVELOPMENT AND MANAGEMENT	84,480	95,550	90,550
SCIENCE AND TECHNOLOGY RESEARCH CENTERS	0	30,000	25,000
SCIENTIFIC, TECHNOLOGICAL, AND INTERNATIONAL AFFAIRS			
Industrial Science and Technological Innovation	17,275	19,037	18,850
International Cooperative Scientific Activities	10,727	11,549	11,275
Policy Research Analysis	848	848	850
Science Resources Studies	3,954	4,509	4,302
Research Initiation and Improvement	11,243	15,043	15,043
TOTAL, STIA	44,047	50,986	50,320
TOTAL, RESEARCH AND RELATED ACT.	1,454,265	1,633,000	1,583,000
SCIENCE AND ENGINEERING EDUCATION			
Teacher Preparation and Enhancement	45,520	53,500	63,500
Materials Development, Research and Informal Science Education	37,541	43,500	44,000
Undergraduate Science, Engineering and Mathematics Education	19,000	23,500	28,000
Research Career Development	34,000	31,000	31,000
Studies and Program Assessment	3,200	4,500	4,500
TOTAL, SEE	139,261	156,000	171,000
U.S. ANTARCTIC PROGRAM			
U.S. Antarctic Research Program	13,500	15,500	15,500
Antarctic Operations	85,402	92,200	87,200
Major Construction and Procurement	25,900	33,300	28,300
TOTAL, USAP	124,802	141,000	131,000
TOTAL, NSF	$1,718,328	$1,930,000	$1,885,000

ATTACHMENT B

BIOLOGICAL, BEHAVIORAL AND SOCIAL SCIENCES

BEHAVIORAL AND NEURAL SCIENCES CROSSWALK
FY 1989 Current Plan
(dollars in millions)

OLD PROGRAM STRUCTURE		NEW PROGRAM STRUCTURE			
		Anthropology	Language, Cognition and Social Behavior	Biological Basis of Behavior	Neuroscience
Anthropology	$7.81	$7.81			
Linguistics	3.06		$3.06		
Memory & Cognitive Processes	3.38		3.38		
Social & Developmental Psychology	3.18		3.18		
Integrative Neural Systems	5.53			$5.53	
Psychobiology	5.54			5.54	
Developmental Neuroscience	5.15				$5.15
Molecular & Cellular Neurobiology	5.66				5.66
Sensory Physiology & Perception	6.07				6.07
Total	$45.38	$7.81	$9.62	$11.07	$16.88

CELLULAR BIOSCIENCES CROSSWALK
FY 1989 Current Plan
(dollars in millions)

OLD PROGRAM STRUCTURE		NEW PROGRAM STRUCTURE			
		Cell Biology	Cellular Biochemistry	Developmental Biology	Physiological Processes
Cell Biology	$10.82	$10.82			
Cellular Physiology	8.59	5.18			$3.41
Developmental Biology	13.30			$13.30	
Metabolic Biology	14.23		$12.00	0.80	1.43
Regulatory Biology	9.27				9.27
Total	$56.21	$16.00	$12.00	$14.10	$14.11

PUBLISHING RESEARCH RESULTS

Senator **Kerrey**. The grants that are going out, an issue of concern to me again, and it's sort of off the chart as we move into this new era, is the increased amount of private contributions to public research and the contracts that are being signed. There are a number of contracts that I'm aware of, and I don't know what the percentages are or what the dollar amounts are that are being signed basically with a requirement that says do not publish until we determine whether or not the application of the research has any commercial value at all.

Just intuitively I look at that as something that, at least in theory, runs against the principle of distribution of information that I think has been used rather well in the United States of America to advance science and the application of science. The connections very often are what matter and not just whatever all basic data is delivered.

Does that trend bother you?

Mr. **Bloch**. Well, that was what I meant before, when we talked about misconduct and I brought up the point about openness. I call that openness, being open with the results of your research and making it available to whoever can use it, be it industry or colleagues in academia.

The trend that we have seen——

Senator **Kerrey**. By the way, if I'm doing research, let's say on biodiversity, and I apply for and get $125,000 over 24 months to do research on biodiversity and I get a match, let's say from Acme, Inc., for $0.5 million and they say that contingent upon that $0.5 million is a requirement that I not provide this information publicly until they have assessed it, does that disqualify me from getting an NSF grant?

Mr. **Bloch**. No; and it shouldn't.

Senator **Kerrey**. You would permit it.

Mr. **Bloch**. It's permitted, but we hope that Acme is reasonable and asks you not to publish for a short period of time while they have a chance of assessing the patentability of whatever your invention or discovery is. A short period of time is something like 3 months or 6 months and not 6 years.

INVENTION RIGHTS

Senator **Kerrey**. It's a hope only though. Is it a part of your evaluation to determine whether or not that kind of requirement is——

Mr. **Bloch**. I don't think so, but the universities place stringent requirements on their researchers. They have rules and regulations of what the data or invention rights are and to whom they belong and what can be done as a consequence, and I haven't seen any great problems emerging. We have many of those supports coming from industry in our STC's, science and technology centers, in our ERC's, as well as in individual grant requests, but I haven't seen any difficulties in terms of the delay or withholding of information completely.

I think what you have to watch out for are large contracts, where a company walks into a university and ties up a whole institute, which has happened in the medical and biotechnology area. Those are the ones to watch out for.

Senator KERREY. Do you watch out for that?

Mr. BLOCH. Well, we don't have occasion to because nobody has walked into anything that we are funding and offered a big contract in competition to us. I'm sure in NIH that problem is more current because it occurs in the biotechnology area where, for example, a German company walked into Harvard and offered a pretty sizeable kind of a contract.

Senator KERREY. But it's not a part of the evaluation process and the question is not asked?

Mr. BLOCH. I don't think so.

Dr. MOORE. Not formally, although I would say that if we were, for example, looking at engineering research centers for renewal and we found that there was a real problem in that respect, we would certainly take that into account in evaluating that center, because we are interested in developing technology in those centers that can be transferred to industry. To do that we recognize that it's necessary that there be some kind of property protection for the knowledge that is generated or it won't be valuable to the institutions that are using it. But we also recognize the great need to get the information published so that it can be used by others. So that's a balance that has to be struck there.

Senator KERREY. And, by the way, I'll express my opinion. If it's private, it can remain private. If it has public participation in any way, it should be public period. I mean I have not only grave reservations, but substantial objections to private contracts with public institutions that require non-disclosure. I really do.

Dr. MOORE. I don't think we would disagree with that at all.

Mr. BLOCH. Let me mention one thing from my experience in industry. We negotiated many contracts and grants with many universities when I was at IBM, and there was never the question of withholding information. There was a question of delay many times. The universities themselves were very alert to that particular problem and wanted to minimize that delay because in the end, the individual investigator is judged by what he is publishing. So he or she has every incentive to make these results known.

There are some industries in which there is a bigger problem, such as the pharmaceutical industry, because a patent can very well mean a product. That's not true in many of the other industries where a patent is one of many that make up a product.

PEER REVIEW

Senator KERREY. Let me open up peer review a little bit and spend a little bit of time on that because it's not something that I understand very well and the Chair again has got some questions on it. So I'll begin with the questions that she left for me.

The first is that NSF makes virtually all of its selections for awarding individual grants through peer or merit review, as I understand it, and that NSF believes that despite not infrequent criticism that this is the preferred way to determine which projects are the highest scientific and technical merit even though it is generally a very subjective process.

Could you just go through how you manage the peer review process?

Mr. BLOCH. Well, as you said, it's a complex kind of a process, but all submissions and all grant requests to the Foundation are subject to the peer review, or merit review, process. It can take on a number of forms. In many cases it's done by sending out the proposal application to a number of investigators or peers who then comment on that particular request in writing.

The program officer, who is a central point from our viewpoint, takes all these inputs and then comes up with a result and either awards a grant or denies a grant. I should tell you that the program officer has the last say in that particular matter. If the results are split, he can lean in one direction or another. If he thinks the results are completely wrong, he can go out for another review. That's one way.

A second way is that, in a number of our programs where it is appropriate, we have panels. A panel comes in and looks at 100 grant requests and then sorts them out in priority order by excellence and also by how important the proposals are and what it means to science and what it means to all the other things that we are taking into account. So it's dependent essentially on the viewpoints and the opinions of the peers that are working in that same area.

We are take a lot of precautions to be sure that an individual reviewer doesn't have a conflict of interest with the particular proposal that he is considering. We are making sure that we have good representation on these reviews, that they don't all come out of one university or one type of university, but that they are distributed. We make sure that our reviewers are geographically distributed, whereby involving the whole community, and that's about the procedure.

COMPARISON WITH INDUSTRIAL PLANNING

Senator KERREY. I would be curious to know if you think what you have just described would fall under the general heading, and given that you've had some experience and are just on leave from the Hoover Institute get Mr. Moore's opinion as well, as to whether this falls under the general category of industrial planning?

Mr. BLOCH. Industrial planning?

Senator KERREY. Yes.

Mr. BLOCH. I wouldn't associate it with that at all.

Senator KERREY. Essentially you've got a group of American citizens who will sit down and make determinations with objective and subjective tools at their disposal about how to allocate America's resource dollars based upon what I think you said yesterday is a desire to make certain that the national interests are served as well as the interests of the research community.

Mr. BLOCH. The research dollars are preallocated. We are asking for input say in mathematics. We preallocate to the mathematics divisions *x* number of dollars, and then within those *x* number of dollars decisions are made on a one-on-one grant basis about which ones we are going to fund.

The strategic plan of the Foundation and the strategic plan of each division guide the general direction we want to move, and what comes in from the reviewers to the program officer are the specifics and the details, but I don't compare that to industrial planning.

You are the economist.

Dr. MOORE. Well, no, I wouldn't either. Another observation is that we use a lot of people in this process. Every year we probably use 50,000 reviewers to review proposals across the entire Foundation, and there is no way in which those 50,000 people are actually planning something as a group. They are simply evaluating the proposals that come in response to our program solicitations that, as Mr. Bloch has just mentioned, reflect the budgets that have been preallocated to particular areas.

Senator KERREY. But I hear you only passing judgment on the quality of their planning and not that they are planning at all. I mean you may think, Well we've got 50,000 people dispersed all over the place and so they can't possibly do very good industrial planning, and that may be, in fact, the case. Some of Senator Grassley's questions yesterday, I think, in fact, are sort of on that target.

I don't want to attach a positive or a negative to industrial planning, but if you take, for example, your materials expert review, do they in the process of evaluating which grants to put out make judgments about whether or not this particular research is going to advance the economic interests of the United States?

[Chairman Mikulski joined her colleagues at the table at this point in the proceedings.]

PLANNING PROCESS

Dr. MOORE. Let me put it a little bit differently. The planning takes place in the process we are going through right now, which is the formation of our budget, and which has been of course preceded by our strategic planning at the Foundation itself.

The planning results in a budget which has a certain amount of money allocated to each of these many areas in which we are supporting research. Then what the review process does is select the best proposals in each of those areas, thereby supporting a planning process. You could look at it that way. It's supporting a planning process that is going on here, that we are going through together with the Congress.

Senator KERREY. I think if you took what you just said and laid it out on a piece of paper and look at it and show it to 100 people and ask them, what is this, they would say you're trying to manage the allocation of research dollars in such a way that it will improve the status of the United States of America.

That would fall I think under a general heading. My problem is that I have people just knee jerking and saying, "Oh, God, no, we don't want to do industrial planning," and I think we're doing it already.

The question is, are we doing as good a job as we ought to be doing, and I happen to believe that in almost any endeavor, including my questioning of you, we can improve the job that we're doing.

Mr. **Bloch**. I still wouldn't equate it to industrial planning.

Senator **Kerrey**. I'm not talking about equating. I'm saying only is it under the general category. I don't equate it at all. I don't equate it as industrial planning as if there is something to equate it with. I'm just simply saying would it if you were trying to categorize this human behavior or whatever this activity is, this peer review is, and you're looking for a place to slot it, would you put it under industrial planning?

Mr. **Bloch**. I would say it a little bit differently. I would say that what the Foundation does when it comes in with a budget request and what Congress does when it grants or doesn't grant or modify a budget request, that is a plan. What the peer reviewers are doing is essentially within the confines of that plan, making judgments on the excellence or nonexcellence of a proposal.

Senator **Kerrey**. I'm going to do what I should have done before I got off into this one, and that is to yield to Senator Grassley.

Senator **Mikulski**. Senator Kerrey, I know you're going up to Senator Adams' hearing on D.C. and the drug situation.

Senator **Kerrey**. Yes.

Senator **Mikulski**. Thank you very much for chairing this for me. I was up there for part of the testimony. Mayor Barry has just completed his testimony, and I'm sure you'll be there on time for the questions.

So thank you for doing that.

Senator Grassley, do you have questions for Mr. Bloch?

CLARIFICATION OF IOWA PROJECT

Senator **Grassley**. I'm going to ask you to submit something in writing. I know you asked for an opportunity to clarify your answer on the Iowa project I brought up yesterday. I hope that I can ask you to clarify that in writing for the record.

Mr. **Bloch**. Very well.

Senator **Grassley**. I appreciate the fact that you have more information and want to provide it, because I would like to go on to a series of questions that I have, but I will be happy to look at whatever you submit.

Mr. **Bloch**. We will be glad to do that.

Senator **Grassley**. Send it not only for the record, but also send a copy to me. I would appreciate it.

[The information follows:]

During yesterday's hearings, the Committeee made reference to an NSF program manager who apparently told a researcher at Iowa State University "never to apply for funding again for reasons that had nothing to do with the technical merit of any past or future proposals."

NSF was notified on October 26, 1988 by Iowa State University President Eaton of the remarks attributed to this NSF program manager concerning the fate of future proposals that might be submitted by the university. It was clearly inappropriate for the program manager to have left the university with this impression.

The impropriety of this statement was clearly conveyed to the program manager and a response dated November 3,1988 to President Eaton stated that "I want to provide you with my own personal assurances that this issue will have no impact upon any current or future proposals that Iowa State may wish to submit to NSF. All proposals submitted to the Foundation will be fairly and objectively evaluated on the basis of its merits and that will be the basis upon which any funding decision is made."

EXPERIMENTAL PROGRAM IN ENGINEERING

Senator GRASSLEY. It's my understanding that the NSF Engineering Directorate has experimented with giving small awards, perhaps up to 10 percent of the program manager's budget, without peer review, but with review of the results after the award has been made. Is this experiment still underway and has it been successful?

Mr. BLOCH. Yes; this experiment is still underway. Let me clarify a couple of points on that. This program, if you want to call it that, or project came out of a clear understanding that we needed to take more chances than we normally take with some of the proposals, that some of them that look like they are out in left field should be more closely considered than the present implementation of the peer review system allows them to be.

Second, it was very important that we give an individual a chance to show what he can do, even if it's an off-the-wall idea, and for that reason we established the program. It's limited in funds, both to the individual as well as in total. In engineering, it was limited to a maximum of 5 percent of that Directorate's budget, and it never came close to 5 percent. It was more like 1½ or 2 percent.

Within the program itself, the limitation on the engineering program was about $30,000 per award maximum. It was for 1 year, and not renewable. If an individual wanted to pursue it further, he had to go back into——

Senator GRASSLEY. So you feel it has been successful?

Mr. BLOCH. I think it has been highly successful. In fact, we are considering implementing it across the whole Foundation.

PORK BARREL SCIENCE

Senator GRASSLEY. What constitutes pork barrel science? Is it a research project conducted without technical review or is it the funding of a research project without competitive procurement? Basically I'm trying to get your feeling on when an earmark is an earmark? [Laughter.]

Mr. BLOCH. Well, an earmark—well, let me start from the other end. I consider it pork barrel science when there is an allocation of either research funds or bricks and mortar to a university or a college or an institution without going through a total peer review process. In other words, it was not in competition with other of those requests and, therefore, you can't be sure that the science that is being done there is of the highest quality. It doesn't have the quality control that a peer review program has.

Senator GRASSLEY. Then let me ask you about, for instance, about the Lincoln Laboratory which receives approximately $150 million in funding from the Defense Department. There is no competitive solicitation of research proposals for the funding and the merit review process is conducted by the Department of Defense rather than by a group of independent peer reviewers. Does this, in your view, constitute an earmark of Federal research dollars?

Mr. Bloch. Not necessarily, because the Lincoln Laboratory, which goes back 30 or 40 years by now, was established as a laboratory that could be used by the Department of Defense to do some of their research work, and as a consequence that contract was made at that time. I assume at that time there was a peer review of some sort and that there was more than one proposal. It could also have come out of the war years and was——

Senator Grassley. We're talking about $150 million now.

Mr. Bloch. Well, that's right, but nevertheless the laboratory was established and the——

Senator Grassley. Well, it doesn't have a group of independent peer reviewers today.

Mr. Bloch. I understand that, but the Government wanted that laboratory as an extension of its own laboratories essentially, and rather than setting it up within the Government, it set it up in the academic sector. So it takes on the responsibility for continuing that.

Senator Grassley. Well, this year numerous universities are going to testify in support of new research programs and policy initiatives in areas such as high definition television, the technological competitiveness of the steel industry and global warming and you can probably name a lot of other things that universities are going to be in here testifying about.

Universities engage in such activities because these are important national and international problems about which they are seriously concerned, but university faculty and administrators are also in Washington to testify in support of such initiatives because they have educational and research programs in these areas that will benefit from an infusion of Federal dollars allocated to address these problems.

So, Mr. Bloch, in your view, should universities be in the business of lobbying Congress to support research in one area or another or even choosing one over another such as HDTV or global warming? Do you think that's legitimate?

Mr. Bloch. Well, I think it's legitimate for universities or faculty or administrators to express their opinions of what the needs of the country are.

Senator Grassley. Let's suppose money results from that, is it earmarking or pork barrel science for a university to actively support a program which if established will almost certainly result in new research funding for that university?

Mr. Bloch. Well, I hope that is not a foregone conclusion that it will result in funding for that particular university. I hope there is a review process in between.

WHEN DOES EARMARKING OCCUR?

Senator Grassley. Well, I think that acknowledgment of that process is important, and I appreciate that.

Last year in the fiscal year 1989 Department of Defense appropriation bill an amendment was included to delay the funding of $46 million in university research projects that had received an appropriation but no authorization until the Department of Defense had time to review those projects. This amendment, however, did not disallow or delay any university research project which had been both authorized and appropriated.

In your view, is a university research project which has been both authorized and appropriated an earmarked project? Are projects which have received both an authorization and an appropriation pork barrel projects?

Mr. **Bloch**. Well, I'm not so sure I followed your question, but let me start off answering it and then help me along if you don't mind.

Senator **Grassley**. OK.

Mr. **Bloch**. The event that you refer to, the Senate disallowing certain projects that were in the Defense authorization bill, I applaud and I applaud you for having voted for the disallowance. I think it was a courageous step and the right step, and it shows essentially that those were pork barrel kind of projects.

Now help me along on your next part of the question.

Senator **Grassley**. Well, the point is that there was not any withholding of funds where it was both authorized and the appropriation went through. Now at that point do you consider that an earmarked project and is that part of pork barrel projects?

Mr. **Bloch**. It could very well be that it was a pork barrel project, if again it didn't go through any competitive competition before it was authorized and appropriated. That fact that authorization and appropriation both occurred, I don't think excludes it from pork barreling. I'll say that's a little bit better than if just at the last minute an appropriation comes forward without an authorization behind it, but I still would claim it's a pork barrel project.

Senator **Grassley**. Well, I would like to ask you then what do you consider the incentives or pressures that work behind pork barrel science? For instance, do you see to any extent it's a need for new or renovated research facilities responsible for creating demand for earmarked research dollars.

Mr. **Bloch**. Well, that's certainly one reason, but let me remind you that's not the only reason for it. Certainly, bricks and mortar was a big reason for that, but we have also seen, at least in the last couple of years, we have seen instances where it went beyond brick and mortar, where research projects were essentially a pork barrel. So it is not just the drive and the need for new buildings or anything like that. It was also the attempt to get money into a university or into an institution to do the actual research.

RESEARCH FACILITIES PROGRAM

Senator **Grassley**. So you support funding for the NSF Academic Research Facility Modernization Program?

Mr. **Bloch**. You should know that we have an authorization bill on that particular issue. We are not asking for funding for it in the 1990 budget. We have set up an office for facilities that has gone through the process of eliciting comments from the academic community. They are in the process of preparing a report that Congress asked us for and we are in the process of finishing that report and filing it on June 1 or June 15, whatever the date is for Congress' perusal.

We have to see where we move from there because that report is going to clarify a lot of things that we are asking for where there is no money in our budget.

Senator GRASSLEY. Just one last question, Madam Chair.

Senator MIKULSKI. Yes, sir; but we do have to move to the Office of Science and Technology Policy.

Senator GRASSLEY. If the Academic Research Facility Modernization Program is not properly funded, what are the prospects for bringing an end to the research project earmarking, individual projects you call, or what maybe is legitimately be called earmarking? It seems to me that it is the relief for some pressure in ending the earmarking and the pork barrel approach.

Mr. BLOCH. Well, we need to understand that there is pressure out there and there is need out there, but it's not a wasteland, let me put it that way. There is a lot of funding from States, from private organizations and from the universities themselves going into bricks and mortar.

By the way, a number of the organizations have taken a stand on that and said don't fund facilities, meaning bricks and mortar out of the request of the National Science Foundation bottom line because the research, in their opinion, has higher priority.

We had a prohibition in this year's budget by this committee and by the House committee that prohibited us from spending any money on bricks and mortar out of the 1989 budget. I think that again shows the priorities that these committees attach to people, instrumentation and then bricks and mortar.

Senator GRASSLEY. I appreciate the exchange and I hope it gives some clarification on your point, but also some clarification on our point of the need and why sometimes you end up with earmarking.

Madam Chair, thank you very much.

Senator MIKULSKI. Well, thank you, Senator Grassley. I think you pursued a very important line of questioning that runs through these projects because I do think academic research has become the new pork barrel. I think we're being lobbied along that, I think boards of regents lobby us along that way and I think our scientific research should relate to a national strategy which hopefully we'll get into in talking with Dr. Graham in a few minutes, and that it should be on the basis of merit, peer review, but also what is in our national interest. Now it's viewed as a tool of economic development and there is no doubt about that, but everybody wants to get a Research Triangle, and I'm afraid we're going to end up looking like a Pentagon. [Laughter.]

So having said that, we thank you, Mr. Bloch, for your testimony.

Mr. BLOCH. Madam Chair, can I just take 1 minute.

Senator MIKULSKI. Everybody always wants 1 more minute. [Laughter.]

Mr. BLOCH. I'll settle for 30 seconds.

Senator MIKULSKI. OK.

CONGRESS' VIEW OF NSF ROLE

Mr. **Bloch**. First of all, I want to thank you for the hearings and for the many questions that you asked and your general interest in the Foundation.

I ask you to think of NSF of being responsible for science and mathematics and engineering education, the total pipeline from precollege all the way through graduate education.

I hope you think of us as being responsible for the technical human resource base of the country because that is what we are trying to be. I hope you think of us as being responsible for supporting the knowledge generation that underlies the competitiveness of the country as well as the safety of the country and the health of the country, and I hope you look at us as a catalyst for cooperation between the three sectors, industry, academia and the government.

The budget request is a large one, I have no doubt about it. A 14-percent increase is very large, but in the total scheme of things, it's a small budget that we represent, $2.2 billion out of about $68 billion of R&D funding.

And I hope for the reasons that I have just cited, that we are responsible for the technical infrastructure of the country, that you find a way of funding our request, and I thank you for the 30 seconds.

SUBMITTED QUESTIONS

Senator **Mikulski**. Thank you.

The subcommittee has a number of questions from myself and various Senators which we will be submitting for your response.

[The following questions were not asked at the hearing, but were submitted to the Foundation for response subsequent to the hearing:]

QUESTIONS SUBMITTED BY SENATOR BARBARA A. MIKULSKI

ROLE OF SUBCOMMITTEE IN FEDERAL R&D SUPPORT

SENATOR MIKULSKI: As you know, federal support for R&D is distributed among a number of appropriations subcommittees. This subcommittee supports NASA, NSF, EPA, and VA Medical research. But this subcommittee also has the responsibility to support programs that help the homeless, veterans benefits, environmental clean up programs, and consumer protection. Our ability in FY 90 to support these various needs will hinge on our 302b allocation. What can you say with respect to the role this subcommittee plays within the overall federal support structure for R&D?

ANSWER: The administration has proposed doubling the NSF budget over the next few years. In light of federal deficit reduction concerns and other administration policies and goals, this kind of priority setting by the administration bodes well for attempting to move some of the money from development in the defense sector back into research in the civilian sector, a concept which the Foundation endorses.

Overall, this subcommittee accounts for about 10% of all Federal R&D appropriations, 20% of academic R&D, and nearly 30% of academic basic research appropriations. It plays a critical role in that it controls the major non-defense, non-medical Federal research and development (R&D) appropriations. The ratio of defense to civilian R&D, which approached 50/50 ten to fifteen years ago, has moved to 65/35 in the past few years. In the long run, a return to a higher emphasis on non-defense R&D is probably more appropriate. The subcommittee's role, affecting the ratio, will have significant impact on the Nation's R&D enterprise.

SENATOR MIKULSKI: Are there certain areas that make this subcommittee's role particularly crucial in research and development which makes our ability to fund NSF through our 302b allocation even more important?

ANSWER: Yes, absolutely. Actions of this subcommittee are critical to university basic research. In the physical sciences, social sciences and engineering the subcommittee is the principal support of academic basic research, providing almost 75% of Federal civilian support to universities in these fields. Over 80% of the support provided to these fields by this subcommittee are provided through NSF.

Scientific and engineering research provide the underpinnings for future technological developments. Recent breakthroughs in superconductivity in Texas and

Alabama and "cold fusion" research in Utah attest to the impact basic research has. Our ability to support basic research today will affect the Nation's economic competitiveness tomorrow. Moreover, our ability to produce a scientifically and technologically literate workforce - comprised of women, minorities and disabled as active participants in the research enterprise - will determine the Nation's ability to compete in an increasingly technological global society.

PRIVATE SECTOR CONTRIBUTION TO FEDERAL R & D

SENATOR MIKULSKI: Much of the Federal investment in R&D made through the NSF budget is justified on the basis of economic competitiveness and contributing to the development of knowledge and people important for economic development. If that investment is so crucial for our industries, we should expect industry to help finance this investment. To what extent does industry cost share in NSF supported activities?

ANSWER: Estimates of the amount cost shared by industry for FY 1988 were about $300 million. Among the major programs which have a large industrial component are:

- MPS - Materials Research Laboratories where funding is directly related to MRL research activities ($12.7 million from industry),
- ENG - Two mandatory cost sharing programs, Engineering Research Centers ($20.6 million from industry), and Industry-University Cooperative Centers (IUCRC) which is leveraged at nearly 7:1 ($20 million from industry $3 million from NSF),
- CISE - Advanced Scientific Computing ($24.2 million),
- STIA - Small Business Industrial Research (SBIR) which has been leveraged at over 10:1 for its Phase III component. Estimates for FY 1988 show nearly $149 million of follow-on funding could arise from FY 1988 Phase 1 awards,
- SEE - Presidential Young Investigators program with an estimated leverage amount of $23.8 million.

SENATOR MIKULSKI: Far too frequently private sector companies can't invest in R&D projects because the rate of return on these projects doesn't take place quickly enough and they become concerned they will be a takeover target if they begin such ventures. What can we do to stimulate private sector investment in long-term R&D projects? For example, should we limit the tax benefits to leveraged buyouts that are crucial to most major takeovers today?

ANSWER: We agree that there is too frequently a short-term economic orientation by the American public and many American firms. This problem is broader than can be explained by the recent merger and LBO phenomenon. For example, we do not presently know whether the long-term effect of mergers and corporate restructuring will be entirely negative. One possible interpretation is that some of the recent slowdown in industrial R&D spending may simply be a result of merged firms eliminating duplication and inefficiency in their R&D programs.

The most direct benefit of R&D to industry is its role in the development of new and improved products, processes, and services, thereby hopefully increasing within a relatively short time the economic position of the company. As a result of this short-term outlook, nearly 75 percent of industrial R&D investment is for development, which typically is expected to provide a payoff within a few years. Even though the payoffs to investments in research by industry may not begin to be realized for a decade or longer, industry does believe that research efforts are crucial to developing and maintaining a healthy and competitive U.S. industry.

However, industry has stressed that the willingness and ability to conduct long-term research depends to a great extent on a confidence in the economy. One of the most important contributions the Government can make is to help create the positive economic environment which makes long-term research investments possible.

Unlike our international competitors, the U.S. has not achieved a consensus on a Government proactive role with regard to commercial civilian technology. However, actions to stimulate private sector investment in longer-term research would include:

- making permanent the R&D incremental tax credit;
- developing more effective protection for intellectual property both at home and abroad;
- encouraging industrial R&D consortia concentrating on generic non-proprietary R&D;
- ensuring an adequate supply of well-trained scientists and engineers; and,
- increasing tax deductions for industrial support of academic research.

Many of these actions were identified by a panel of senior industry research Vice Presidents during a recent NSF/OMB workshop on Basic Research in Industry.

AGENCY PRIORITIES

SENATOR MIKULSKI: NSF's report on trends in the agency's funding indicate that its support for science and engineering education, in the mid-60's, in constant (1988) dollars was between $350 and $400 million. (12/87 NSF Report, p. 19) Yet today, NSF's directorate for science and engineering education budget is only $170 million and is pegged to increase to only $190 million, an 11.1% increase, while the overall agency gets a 14% increase. Don't these figures suggest that you ought to make education a higher priority -- focus on making better teachers instead of reinforcing the "publish or perish" attitude that many research universities have towards their faculty?

ANSWER: The activities supported in the mid-60's were in support of Scientific Manpower, including support for pre-college, undergraduate, graduate and postdoctoral students, as well as informal science education and curriculum development at all levels. A similar comparison of activities that we support today indicate that NSF is approaching that same level of support; what is different is the mix between precollege, undergraduate and graduate support.

The Foundation continues to place the highest priority on education and human resource development as it applies to every sector of the NSF. In FY 1990 the largest increase (22%) is proposed to support these activities, and notably the largest single increase ($40 million) for any set of activities at NSF has been proposed for the NSF-wide set of undergraduate initiatives. This exemplifies NSF's attempts to elevate the importance of undergraduate education within every discipline by giving them a stake in its development and importance.

NEW STARTS: SELECTION PROCESS

SENATOR MIKULSKI: You are proposing at least nine new starts or major augmentations to existing programs for FY 90. Agencies like NASA do fairly extensive studies before undertaking new initiatives. I realize that NSF has a budget which is relatively small compared to NASA, but I'm sure that there must be some groundwork that you do. What kind of studies does NSF do prior to going to OMB with a new start?

ANSWER: In determining the priority of an initiative NSF reviews reports and studies done both in-house and by outside sources.

Internally:

- o An NSF Antarctic Safety Panel appointed by the Director, issued the Safety in Antarctic Report in 1988. The recommendations in this report led to the major, multi-year Safety Environment, and Health Initiative proposed in 1990.

- o In response to concerns of the National Science Board over the status of undergradaute education, the Neal Report (1986), NSF undertook an undergraduate research and education initiative.

Enternally:

The Foundation works with other agencies to develop initiatives.

- o The report on Large Scale Computing on Science and Engineering was developed jointly with the Department of Defense. This report established goals for the Foundation's Advanced Scientific Computing activity in the areas of supercomputing, access networking, software/algorithm research, and training.

Studies and reports of the National Academy of Sciences (NAS) influence the priority of NSF initiatives when there is broad consensus among scientists on findings and recommendations. NAS reports that have influenced priority setting include:

- o the Opportunities in Chemistry Report which surveyed opportunities in the Chemical Sciences; and
- o the NAS report Reviewing U.S. Mathematics: Critical Resource for the Future which affected the strategy for funding mathematical science programs.

Final decisions about major projects are made by the National Science Board prior to a request to OMB. Project Development Plans considered by the Board include discussion of the scientific need for the project; views of advisory groups and the scientific community; cost estimates; management, procurement and legal considerations; project milestones; fequency of project management and fiscal reports; and ongoing project evaluation.

SENATOR MIKULSKI: How many years prior to a new start are these studies done and how are the results of a specific study evaluated?

ANSWER: Studies are completed at various times, but most have been completed within the past two years of a budget submission. Some of them are themselves evaluations against which a broad call for action is made. Good examples of these are the various reports that have come out over the past couple of years evaluating our nation's precollege students performance in science education against that of other countries.

Other reports, like the Report of the NSF Panel on Large Magnetic Fields, recommend specific action. This report called for the construction of a new National High Magnetic Field Laboratory and that recommendation was evaluated in light of the status of the current National Magnetic Laboratory at MIT, impact to research on magnets, technological devlopment, economic competitiveness, and the relative strengths of other countries in this disciplinary field.

SENATOR MIKULSKI: For each of the proposals you have proposed for the FY 90 budget, and the Subcommittee staff can provide you with the list of new starts we've found in your budget, could you provide us with the studies you've used to support these new starts?

ANSWER: The following list addresses a number of major proposals in the FY 1990 NSF budget and at least one of the reports which played a significant role in the development or enhancement of the initiative:

Biotic Systems (Biodiversity)

Technologies to Maintain Biological Diversity, 1987 Office of Technology Assessment. This report led to a National Science Board task force on global diversity (report due summer of '89) as well as a new budget initiative on biodiversity in FY 1990 request.

Science and Technology Centers

Science and Technology Centers: Principles and Guidelines National Academy of Sciences. A Report of the Panel on Science and Technology Centers. National Academy of Sciences, June, 1987. This panel recommended that NSF treat the Science and Technology Center program as a single competition across all fields of science and technology.

Computer Networking and Communications Research and Infrastructure

Federal Coordinating Council on Science, Engineering and Technology (FCCSET) of the Office of Science and Technology Policy, A National Strategy for High Performance Computing. 1987. Brought together interagency cooperative activity on high performance computing research and national networking. Led to NSF national network leadership and program focus within the Computer and Information Science and Engineering Activity.

National Research Council, National Network Review Committee, Computer Science Technology Board, Toward A National Research Network, National Academy Press, 1988. Confirmed soundness of FCCSET views of needs and scope for national research network.

Advanced Scientific Computing

Report on the Panel on Large Scale Computing in Science and Engineering (Joint DOD and NSF Panel), 1982.

Established goals for NSF Advanced Scientific Computing activity: supercomputing access, networking, software/algorithm research, training, balanced computing environment. Served as initial long-range planning guide for continuous assessment and upgrade of NSF Advanced Scientific Computing Centers.

U.S. Antarctic Program

Special Antarctic Safety Panel (appointed by NSF Director), Safety in Antarctic, 1988. Recommendations in this report led to the major, multi-year Safety, Environment, and Health initiative proposed in the FY 1990 budget.

Earth Science

National Academy of Sciences, Confronting Natural Disasters: An International Decade for Natural Hazard Reduction. The Earthquake Hazard Mitigation and Natural and Man Made Hazard Mitigation Programs are using this report to help plan our participation in these programs.

Mathematics

Computer Science Technology Board, The National Challenge in Computer Science and Technology, 1988. Outlined and confirmed role of computing in national economic competitiveness, and stressed impact of basic research and human resources in CS/CE; assisted focus on economic competitiveness in CISE budget request.

Reviewing U.S. Mathematics: Critical Resources for the Future (1984) -- generally known as the David Report. Significant effect on funding in mathematical sciences. If FY 1990 budget passes, funding for Div. of Math. Sciences will have increased almost 60% in 5 years. This was so convincing a report that mathematical sciences was protected at NSF in 1986, with Congressional approval, from the Gramm-Rudman-Hollings sequestration.

National High Magnetic Field Laboratory

Report of NSF Panel on Large Magnetic Fields. July, 1988.
-Professor Frederick Seitz of the Rockefeller University and Professor Robert C. Richardson of Cornell University. Findings and recommendations in this report provided basis for FY 1990 budget request for new National High Magnetic Field Laboratory.

OFFICE OF INSPECTOR GENERAL

SENATOR MIKULSKI: What differences, if any, are there between the audit emphases given by the Inspector General and by its predecessor organization, the Office of Audit and Oversight? For example, will the new Inspector General do any random audits other than those referred to it by particular institutions or other federal agencies?

ANSWER: The audit emphases are not expected to change significantly. Audits currently include not only cases where problems are suspected but also a reasonable sample of institutions not otherwise audited by the Federal Government. The latter sample is chosen with emphasis on those organizations receiving sizeable National Science Foundation funding but smaller organizations are included as well.

SENATOR MIKULSKI: If NSF receives its full budget request, it will be about 1/5 the size of NASA. NASA's Office of Inspector General receives about $9 million annually (NASA, I-AS, 11), an amount I think is probably too low. How much do you plan to give to your IG? A ratio proportionate to NASA's would mean that you give the Office about $1.8 million.

ANSWER: NSF plans to provide $2.6 million for the Inspector General (IG) function. As demonstrated in the following table, this level compares favorably with the request by NASA for its IG in FY 1990.

COMPARISON OF FY 1990 INSPECTOR GENERAL (IG)
BUDGET REQUESTS
FOR NASA AND NSF
(Dollars in Millions)

	Tot. Req.	Tot. FTE Req.	IG Req.	IG FTE Req.	% of Tot. For IG	% of FTE For IG
NASA	$13,148	23,861	$8.8	146	.066%	0.61%
NSF	$2,149	1,230	$2.6	23	.120%	1.87%

PEER REVIEW

SENATOR MIKULSKI: NSF makes virtually all of its selections for awarding individual grants through peer or "merit" review. NSF believes, despite not infrequent criticism, that this is the preferred way to determine which projects are of the highest scientific and technical merit, even though it is generally a very subjective process. How does NSF manage the peer review process?

ANSWER: Although there is some variation from program to program, the proposal review process generally operates as follows: proposals are assigned to a program officer who oversees external review, evaluates reviewers' comments, and makes a recommendation to award or decline it, taking into account other considerations such as the relationship of the work to the field as a whole and to other pending proposals, the program's purposes and budget, and Foundation-wide objectives.

The program officer's recommendations are reviewed at one or more supervisory levels. In a few cases, (new programs, major grants) they are further reviewed by the National Science Board. For recommended awards, grants specialists then check all the nonscientific aspects (e.g., indirect costs, compliance with policies) and issue the formal commitment to the grantee's institution.

The specific review procedure depends on the tradition of the field: in the physical sciences, engineering, and some geosciences programs, proposals are usually mailed to reviewers who respond individually; in the biological and social sciences and some geosciences programs a panel reviews the proposals in addition to the ad hoc reviews. For large proposals (e.g. centers and facilities), these reviews are often supplemented with site visits by teams of external reviewers and staff.

In the mail-out procedure, the proposal is sent to several people -- sometimes as many as ten -- identified by the program officer as knowledgeable about the topic. The reviewer receives standard instructions and forms and responds directly to the program officer. Where panels are used, they meet at some specified interval (two or three times a year in the larger programs) to weigh a group of proposals, taking into account the prior mail reviews. On average, a proposal has the benefit of 5.5 completed written external reviews.

The Foundation is well aware of the criticisms of our proposal review system. Any system that rejects two-thirds of some 20,000 applications each year will indeed be criticized. Over the years we have made many efforts to meet the criticisms, such as: tightening and clarifying conflicts-of-interest instructions; having "visiting committees" of external reviewers regularly assess decisions in each program; reducing proposal requirements; and improving internal proposal handling and assignment.

One of our recent efforts to understand the dynamics and problems of the system was the first mass survey of applicants for NSF research grants. More than 9,500 responded. Briefly, their views depended on the extent of their experience with NSF: the quarter whose proposals were repeatedly declined were the most critical group.

Dissatisfied applicants, we found, were not very likely to complain about the existence of cronyism, politics, "old boys' network", favoritism toward certain schools, or other such biases. Instead, they were much more likely to express disappointment in the thoroughness or sharpness of the reviewers' comments, and too often found them to be superficial or conflicting, or that the reviewers did not seem to be sufficiently expert in parts of the subject matter.

The results of the survey are reported in NSF 88-4 (February 1988), and in an article (with related commentaries) in Science, Technology and Human Values, Winter 1989.

SENATOR MIKULSKI: What weight is given to the views of the program officer versus the recommendation of the peer review panel, in selecting projects to support? Can you give any examples of major grant awards that were given despite the objections of a program officer, or despite the objections of the peer review panel?

ANSWER. About a quarter of the award/decline decisions cannot be predicted by averaging reviewers' ratings. Programs do not usually convert reviewer ratings (excellent, very good, etc.) to numbers, then average and rank them; but when the Evaluation Staff does so as a system check, we almost always find that all the top proposals in a program are funded and the bottom ones declined, but the mix of award/decline decisions in the middle area reflects program managers' judgments and application of Foundation-wide policies.

SENATOR MIKULSKI: What controls have you established to guard against such things as fraud or awarding projects on the basis of a quid pro quo situation, where one or more members of the peer review panel may themselves be the subject of a future peer review by the person whose proposal they are reviewing?

ANSWER: Several safeguards have been built in over the years to ensure an open and fair system:

(1) Conflicts of Interest: Reviewers and program officers are asked to identify any academic affiliations, personal relationships or financial interests that could constitute or be regarded as a conflict, and to withdraw from the decision process if warranted.

(2) Verbatim Reviews: All reviews are routinely sent to the proposer, but without attribution to individual reviewers. Where panels are employed, summaries of their deliberations are also provided.

(3) Formal Reconsideration: At the applicant's request, reconsideration may be carried out by persons not involved in the earlier decision. This is not a "de novo" review of the scientific merits but examination of how the case was handled by the program officer. An applicant not satisfied with the first reconsideration may have his or her institution request a further reconsideration by the Foundation's deputy director.

(4) Sampling: The Director's Office of Audit and Oversight routinely samples actions for compliance with Foundation procedures and provides direct feedback to the program division.

(5) External Peer Oversight: Each program is given a comprehensive review every three years by a small group of external peers familiar with the field. These "visiting committees" make formal reports to the NSF Director. The reports, and the annual summary, are available to the public.

(6) Analyses of Decision Patterns: The Director's Program Evaluation Staff runs statistical test to see how the system has treated various classes of applicants.

(7) Informal Program Checks: Our actions and decisions are meant to be open, above board, and subject to scrutiny from applicants and outside bodies. The Foundation is well respected within the various research and education communities for its tradition of seeking, listening to, and taking action on, input from those we serve.

SENATOR MIKULSKI: How frequently do people review proposals of a scientist who later will be part of a review panel that evaluates their own grant proposal, never, 5% of the time, or some other figure? In those instances when this happens, how do you insure the integrity of the process? It is simply left up to the honesty of the peer review panel members?

ANSWER: Aside from continuing grant amendments, NSF receives for review each year about 25,000 proposals to over 300 NSF programs. In 1987, for example, over 60,000 individuals were requested. NSF has a policy that there must be a minimum of three reviews before a proposal can be acted upon. Most frequently proposals have five to six reviews, so that between 125,000 and 150,000 reviews are received each year.

NSF uses a variety of review mechanisms, including mail review, panel review, or a combination of both. In addition, ad hoc reviews are conducted or special Blue Ribbon Panels are convened.

The specialized communities that NSF deals with are relatively small, however, the situation described in the question will occur. Exactly how often is unknown because the need for such a tracking mechanism has never developed. NSF receives very few complaints under the circumstances, and that is due to the several safeguards that have been built in over the years to ensure and open and fair system. Theses safeguards include the following:

(1) Conflicts of Interest: Reviewers and program officers are asked to identify any academic affiliations, personal relationships or financial interests that could constitute or be regarded as a conflict, and to withdraw from the decision process if warranted.

(2) Verbatim Reviews: All reviews are routinely sent to the proposer, but without attribution to individual reviewers. Where panels are employed, summaries of their deliberations are also provided.

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(6) Analyses of Decision Patterns: The Director's Program Evaluation Staff runs annual statistical tests to see how the system has treated various classes of applicants.

(7) Informal Program Checks: Our actions and decisions are meant to be open, above board, and subject to scrutiny from applicants and outside bodies. The Foundation is well respected within the various research and education communities for its tradition of seeking, listening to, and taking action on, input from those we serve.

MISCONDUCT IN SCIENCE RESEARCH

SENATOR MIKULSKI: Your regulations say that few allegations of fraud or abuse have been received in the last five years. (Federal Register, 7/1/87 - page 24466) How many institutions receiving National Science Foundation funding have reported instances of scientific fraud or misconduct in that period?

ANSWER: During the last five years seventy two thousand grants have been awarded. From this population we are aware of eight cases of confirmed scientific misconduct. Two cases were discovered and reported by the institution; the remainding six cases, including two which were minor, were brought to our attention by reviewers.

SENATOR MIKULSKI: The fact that there have been few instances reported doesn't prove that there isn't fraud or abuse out there, it's just that it hasn't been reported, correct?

ANSWER: Like all forms of civil and criminal misconduct, actual instances probably exceed the number of reported cases. This is due primarily to the strong disincentives for an individual witnessing misconduct to report it. Most cases of scientific misconduct are brought to light by whistle-blowers --those actually in a position to know that misconduct has occurred -- not peer review or audit.

SENATOR MIKULSKI: How can National Science Foundation, whose research work is based upon empirical data, suggest there is no fraud or abuse when you haven't done any random surveys to determine if there is any? That would be like those who told Copernicus that the Sun revolves around the Earth simply because they refused to study any other possibility and were afraid of the consequences from a different conclusion.

ANSWER: We have not suggested that there is no fraud or abuse extant; we have published regulations dealing with such matters because we believe that it does occur infrequently and that any such cases damage the nation's scientific enterprise and cannot be tolerated or swept under the rug. However, for reasons we don't yet fully understand, most scientific misconduct appears to occur in the biomedical fields. Difficulty of replication with human experiments, immense financial incentives, careerism, and other factors are being looked at to explain this difference. It should be noted that individuals engaged in the research are the primary source of reports on scientific misconduct. Random audits and peer review are not equipped, for the most part, to detect fraud after-the-fact.

SENATOR MIKULSKI: There has been growing concern about the potential for fraud at National Institutes of Health and even one instance of actual fraud in one project there. Given this fact, has National Science Foundation instituted any special programs to inform researchers what activities comprise scientific misconduct and the penalties for knowingly engaging in such practices?

ANSWER: We have indicated in speeches, in publishing our regulations, and in supporting conferences and research projects (e.g., the conference of Biology Editors at the National Academy of Sciences in October 1988) that we view the matter very seriously. The National Science Foundation Office of General Counsel has been active with the National Conference of Lawyers and Scientists, National Institutes of Health, and National Academy of Sciences, helping to refine definitions and investigative procedures.

SENATOR MIKULSKI: If not, does the Foundation have any intentions of doing so? If so, was this material mailed to the researcher's corresponding university research office? If not, how could the university investigate misconduct if it has not received a statement from the National Science Foundation describing what it considers to be scientific misconduct?

ANSWER: In all cases which have been referred to universities, a copy of the National Science Foundation regulations has been included with the referral letter.

SENATOR MIKULSKI: A panel appointed by the Institute of Medicine (IOM) recently released a report on ways of reducing fraud and "sloppy science." One of the panel's recommendations called for National Institute of Health funded institutions to have specific procedures and policies to encourage responsible research practices. (Chronicle of Higher Education, 2/22/89, page A1, A6) Does the National Science Foundation plan to require its grantee institutions to establish similar procedures?

ANSWER: The National Science Foundation has been encouraging the establishment of such procedures. Since the National Institutes of Health is now requiring that such procedures be in place, these procedures will satisfy the National Science Foundation's need as well.

SENATOR MIKULSKI: If some institutions have established such procedures, has the Foundation reviewed these procedures as to their potential effectiveness, the extent to which researchers are aware of the procedures, and whether the institutions attempts to determine if these procedures are being properly implemented?

ANSWER: No specific review has been made. All cases which the National Science Foundation has referred to institutions have been handled in accordance with the National Science Foundation regulations (a copy of which was sent with each referral).

SENATOR MIKULSKI: The Institute of Medicine report also recommended that research proposals include a description of how raw research data will be stored, who may have access to them, and who eventually will own the results. To what extent can the current peer review process detect scientific misconduct? Have there been any incidents of scientific misconduct reported to the National Science Foundation through the peer review process in the last five (5) years?

ANSWER: The merit review process is a source of allegations of plagiarism but seldom of other types of scientific misconduct. Six (6) of the cases the National Science Foundation has dealt with have been brought to our attention by reviewers.

SENATOR MIKULSKI: Do you believe the Institute of Medicine's recommendation regarding the storage of data help research proposal reviewers detect scientific misconduct?

ANSWER: Proper storage of research data is important in making possible adequate investigation of allegations of fraud or abuse in research. By itself, storage of data does not help detect such problems but known and accepted standards of data storage will act as a deterrent.

SOCIAL AND ECONOMIC SCIENCES

SENATOR MIKULSKI: Your budget indicates that you've shifted much of your emphasis in the social and economic sciences from an exclusive focus on "the individual" to one that integrates more readily trends in organizations and institutions (BBS 20-21).

Of the $33.22 million you propose to spend on social and economic science next year, how much will be spent on the issue of workforce readiness?

Why not, this is a major area of concern any economists and those concerned with U. S. industrial and economic competitiveness.

ANSWER: The Division of Social and Economic Science spends about 10 percent of its budget on a broad range of studies on the labor force and the performance of the American economy. While none of this research deals directly with issues of workforce training, a significant part focuses on the sources and dynamics of labor productivity, which is closely tied to the growing national concerns with economic competitiveness.

SENATOR MIKULSKI: How are results of this research communicated to the Departments of Education & Labor and to state and local governments?

Where do we see this research paying off in terms of improved workforce readiness planning?

ANSWER: The specific research agenda, primarily funded by the Division's Economics and Sociology Programs, examines the extent and significance of the nation's investment in both human capital and the tools with which the labor force is equipped. These studies attempt to gauge the payoff to education and research and development, as well as ways for improving them. Other research efforts which bear on the issue of "workforce readiness" include studies of the effects of population changes such as immigration or shifts in the internal mobility of labor. Another area of inquiry centers on the efficiency with which labor markets operate and the implications of different wage arrangements and incentive systems for improvement of skills.

The cumulative results of these projects provide conceptual and empirical grounding for the policy-specific research applications of federal departments such as Commerce, Labor and Education, as well as for the agencies of state and local governments whose mission likewise calls for dealing with problems associated with workforce readiness. As a rule, the findings of NSF-supported research are published in relevant technical journals to which the staffs of interested bureaus have access. Direct dissemination to mission agencies of basic research outputs is rare, though NSF grantees, acting as consultants or expert witnesses, often forge such links themselves.

WOMEN & MINORITIES

SENATOR MIKULSKI: Where do you stand in your efforts to involve more women, minorities and the disabled as members of the peer review and advisory committees?

ANSWER: We have been focussing very heavily on the participation of minorities and women in our various advisory and evaluation committees, advisory panels, and on our committees and individuals that evaluate and participate in the peer review process. We want to attract more people to it and educate them about the process. Participation has been leveling off though in the past two years, but we are still making gains.

Of the 1046 individuals who participated in this process in 1988, 20.7% were female - an increase from 19.9% the previous year; 9.0% were minorities - an increase from 8.6% the previous year.

AGENCY STAFFING RATIOS

SENATOR MIKULSKI: NSF's budget justification for 1990 (NSF-i and PDM-3) suggest a fairly wide variation in the people to dollars ratio in various Research and Related Activities programs. For example, in Math and Physical Sciences, the ratio is 1 position for every $4.1 million; in Geosciences,$2.4 million per position; Behavioral and Biological Sciences, $2.1 million per position; while in Scientific, Technological and International Affairs the ratio is $500,000 per position. What accounts for the significant difference between the funds requested per FTE for these four programs?

ANSWER: Although the workload in NSF directorates is affected by the size of their program budgets, it is largely driven by other factors. Significant differences in the nature of activities performed by the directorates as well as in the types of programs they support require varying levels of staff. Workload in the NSF scientific research directorates consists primarily of several types of activities: 1) proposal review and funding actions, 2) grant and contract administration, 3) program planning and policy development. Because of the nature and type of support provided, the Biological, Behavioral and Social Sciences (BBS) directorate receives far more proposals which request on average much less funding than does the Mathematical and Physical Sciences directorate (MPS). For example, In 1990 BBS will review about 11,300 proposals and make an estimated 4,000 awards at an average award size of $78,000. During the same period MPS will review 8,600 proposals, making 4,550 awards at an average award size of $122,000.

The Geosciences (GEO) directorate includes Ocean, and Atmospheric Sciences and the U.S. Antarctic Program, which support large organized programs, facilities and research centers. Much of GEO's staff time is devoted to the administration of large grants and contract activities rather than proposal review. Accordingly, GEO is expected to review fewer proposals, about 5,100, and make 2,800 awards.

Although the Scientific Technological and International Affairs (STIA) directorate awards research grants and supports international scientific cooperation, many of the directorate's staff perform functions which are unrelated to the review, award, or management of grants or contracts. These include the study of science issues and the collection, analysis and publication of data on the status of the Nation's science and engineering resources.

SENATOR MIKULSKI: How are staffing needs for your major science directorates determined in comparison with the agency's other staffing needs?

ANSWER: Each directorate and staff office provides and justifies specific estimates of its staffing requirements for the budget year. In addition, staffing, proposal and award workload trend data for each directorate in the Foundation is collected and analyzed. Each Directorate's estimated requirements are considered in light of the workload analysis, as well as the number and types of programs, proposals and awards projected for the year. From this analysis, estimated staffing requirements are developed and incorporated in the budget request.

ENGINEERING RESEARCH CENTERS

SENATOR MIKULSKI: You are proposing an enhancement of $7.65 million, an increase of more than 20%, for Engineering Research Centers in FY 90, to a total of $45.7 million. With this increase you propose to add 3 new centers to the program and expand the level of resources to certain existing centers. An August 1988 GAO study found however, that NSF itself felt it was too soon to evaluate the overall strengths and weaknesses of Engineering Research Center compared to other types of engineering research education (GAO-29,29). What new and specific information have you received since this request was issued that warrant new starts in this area?

ANSWER: The National Academy of Engineering planning study which established the baseline goals for the Engineering Research Centers (ERC) Program recommended the establishment of 25 ERCs for the Program to have a significant broad-based impact on academic engineering research and education, industry, and technological advancement.

The continued addition of new centers is justified in terms of the Program's long range goals and reinforced by early indications of its positive impacts. NSF has now completed two cycles of third-year assessments of the ongoing ERCs. When the GAO study was completed, the first round of third year reviews had just been completed. Those ERCs which passed this review are successfully meeting the challenges set forth by the Program. Those goals are:

- To develop knowledge and technology that advance industrial R&D, such as a new connector developed by the Lehigh ERC which will improve the speed and safety of connecting steel beams on a construction site;

- To provide a new research experience for students that is enhances their capability to work on an engineering system as a whole;

- To expose students to cross-disciplinary, team research with an industrial perspective; and

- To develop interactive industrial collaboration programs which involve industry in planning, research and education. An example is the interaction of the Carnegie Mellon ERC team with industry which provides the basis for new engineering design methodologies for automobile and other design environments.

In January, 1989 the National Academy of Engineering assembled a panel to update the assessment of the ERC program. The panel is reviewing the major goals of the program to determine their efficacy in light of five years of experience. It will provide NSF with recommendations regarding the appropriate number of centers for the next few years, program and center budget levels, and any needed revisions in the ERC concept or the management of the Program. Recommendations of the panel are due in June of 1989.

SENATOR MIKULSKI: Your budget justification indicates you will be continuing to phase out two existing ERCs in 1990 (ENG, 28) whose proposals the National Science Board has decided not to review. A GAO August 1988 study indicated however, that the Science Board decided not to renew these Centers in March, 1988. (GAO, p. 28) Why does it take 2 1/2 years to terminate a contract with a center which the Science Board has determined no longer justifies federal funds? Aerospace contractors don't get this kind of treatment when they are terminated on a contract by NASA. Why should research universities be any different?

ANSWER: After careful review which began with a peer site visit and ended with oversight by the National Science Board, the Foundation determined that two of the first six ERCs were not fulfilling their proposed goals at a high enough level of quality to warrant an investment of 5 more years of support. These centers are now in a 2-year phase-down funding path, with 67 per cent and 33 per cent of their third year funding levels provided in these 2 years respectively. It is a part of the operating system of the program that the ERCs undergo this renewal review at the third year and that unsuccessful ERCs be phased-down in two years.

The third-year review and phase-down strategy was recommended to NSF as a component of the Program by the National Academy of Engineering Committee which provided NSF with the guidelines for the ERC Program. The rationale for this phasing down is to provide continuity of support for graduate students who have research underway which is the basis for their degree programs. The ERCs are large investments supporting both research and education and it is not possible for a university system to quickly provide alternative support to sustain these students. ERCs are a major commitment of resources, focused on long term high risk research and improvements in the educational infrastructure of engineering. As such, they are not comparable to contractual research carried out by the private sector for a mission agency.

SENATOR MIKULSKI: The GAO study also indicated that the number of companies which were unable to meet their financial commitment to a particular ERC grew from 1 in 1985 to 5 in 1987. What was the number of companies which could not meet their commitments in 1988 and what do you project the number to be in 1989?

ANSWER: It is reasonable to expect that of the companies indicating a willingness to support an ERC proposal, some will actually be unable to fulfill that commitment once the proposal is selected for an award. The ERC program anticipates that there will always be some low level of such losses. One firm of the 128 initially involved with the first six centers and 5 of the 283 firms involved with the first fourteen centers established by 1987 is a very low "loss" level. Data is not yet available for FY 1988 and FY 1989 but we would expect the same level of attrition as in past years.

SENATOR MIKULSKI: Who picks up the financial slack at one of these centers if a company doesn't produce?

ANSWER: An ERC projects an operating budget and seeks support from NSF, industry, the university, states, and other government agencies. There is uncertainty about the final levels of support from all these sources. Centers which do not achieve their optimal budgets simply scale back by eliminating projects, equipment, etc. They must, however, keep a balance of projects and activities so they can achieve their stated goals.

SENATOR MIKULSKI: While ERCs are popular with industry, the vast majority of industrial participants surveyed by GAO said that they did not expect new patentable or commercial products to emerge from these centers over the next 5 - 7 years. They did indicate though, that they saw it as a way to improve their own personnel. (GAO, p. 47). While improved engineering education may be valuable, why should NSF and the taxpayer finance expensive engineering centers simply to fund a good farm team for the private sector? Why can't or won't industry do it on its own?

ANSWER: While the GAO report did not probe further regarding the reasoning behind that response, the ERC Program can speculate from interactions with a committee of ERC industrial advisors. They indicate that they support the ERCs and become involved in their planning, research, and education programs because they believe that the ERCs will have a long-term impact on the competitiveness of their firms and their industry. They state that this impact will come because the ERCs are focusing on long-term, high-risk research with a strong potential to contribute to technological advancement. Industry understands that it is their role to focus on developing patentable and commercial products and not the role of the ERCs. Industry expects that the ERCs will be successful vehicles for technology transfer from academia to industry because industry becomes involved early in the research process so the work is geared to the next generation of technological advances.

NSF supports engineering education through the ERCs and other means to provide engineering students with the scientific and engineering skills necessary to be able to contribute in both the public and private sectors as the individuals choose. The ERCs are specifically geared to providing an enhanced level of exposure to cross-disciplinary team research and industrial views so that graduating engineers can contribute better to engineering practice and the competitiveness of American industry. Education has traditionally been a role for the public sector; whereas the cost of continuing education of industrial employees has traditionally been born by the private sector. These relationships continue through the ERC Program. Industry has always relied on public funds to provide an educated workforce and it looks to the ERC program to prepare engineering students to contribute more effectively to industry.

The ERC Program is a partnership among the Federal government, industry, State governments and academia to advance engineering research and education and industrial competitiveness. Across all the centers, NSF provides 50 per cent of the total operating costs, while industry provides 30 per cent, and the universities, states and other Federal agencies provide the remainder.

COMPUTER AND INFORMATION SCIENCE AND ENGINEERING

SIZE OF INDIVIDUAL AWARDS

SENATOR MIKULSKI: You are proposing $191.2 million for CISE, a nearly 26% increase for Computer and Information Science and Engineering. In your budget justification you indicate that part of the proposed increase will go to increase the size of individual grant awards. How much, in terms of both dollars and percentage, do you expect the average grant to increase if the Committee provides you with the full request in this area? (CISE, 4).

ANSWER: Much of the requested increase ($21M of $39M) is for the NSF National Supercomputer Centers and the NSFnet, which service all of the Foundation's research programs, rather than individual awards made via CISE programs. Of the remaining $18M in the request, some will be devoted to large Center and group awards and to educational activities. About $10M is expected to be devoted to new individual awards, raising their average size by about $5.9%, from $79,000 in FY 1989 to approximately $84,000 in FY 1990.

AVERAGE AWARD SIZE

SENATOR MIKULSKI: What other areas of NSF research will increase the size of their individual grant awards and by how much will they increase?

ANSWER: The FY '90 budget incorporates NSF's long range goal of increasing the size, duration, and number of individual awards across all disciplines. It is to be expected that the pattern in award size growth will be affected by the nature of the research.

SENATOR MIKULSKI: What accounts for the disparity in the size of these increases from one area to another?

ANSWER: Differences in award size increases will be affected by the nature of the research and the cost of performing it. The cost of an award varies by such factors as individual disciplinary requirements, instrumentation needs, and personnel requirements.

SENATOR MIKULSKI: What reason can you provide the Committee with to explain why this area of your budget is proposed to increase by nearly twice as much as the overall agency?

ANSWER: The Computer and Information Science and Engineering Directorate is unlike the other directorates in that, in addition to supporting basic research in computing, it houses two large activities that service all NSF: the National Supercomputer Centers and the NSFNET national network. The subactivities in which the service activities are funded comprise about 45 percent of the CISE budget request. More than half of the requested increase (about $21 M of $39 M) for CISE is for long planned increases in these service components. Of this, ($15 M of $21 M) is for meeting existing cooperative agreements and upgrading the supercomputers at the National Centers, which are accessed over the network by thousands of researchers in all disciplines from the entire Nation. The increase for NSFNET upgrades the network to maintain service quality and extend it to presently unserved places. Computing research is an important priority area. The disproportionate increase for basic research computing reflects the importance of the field for scientific and industrial competitiveness, and because it expands what is presently a very small base in our newest research directorate.

SOFTWARE DEVELOPMENT

SENATOR MIKULSKI: You indicate that part of your increase for computation research will go for further development of problem solving software. (CISE, 9-10) Why is this particular kind of software needed for basic computer research and how significant an improvement does it provide for supercomputers computational power?

ANSWER: The reference is to problem-solving methods (often called software engineering techniques) that can be used in the development of a wide range of software. This type of research focuses on improving the productivity of software developers. Better software for supercomputers is a somewhat more specialized issue, and research about it is supported elsewhere in CISE. Improved software can in some cases increase a supercomputer's power substantially. Both focused research and more general software engineering research contribute to better supercomputer performance and utilization, as supercomputer software is often very complex, and needs major revision to make maximum use of new hardware.

SUPPORT FOR INFORMATION PROCESSING TECHNOLOGY

SENATOR MIKULSKI: You indicate that NSF's funds for Information, Robotics and Intelligent Systems ($21.64 million) provides about 50% of federal support for interdisciplinary research in application of information processing technology. (CISE 11.12) What other federal agencies provide this support and how much do they provide (both in dollars and as a percentage of federal funds?

ANSWER: NSF supports basic research in this area at U.S. academic institutions. Besides NSF, several mission agencies, primarily Defense Advanced Projects Agency (DARPA) and Office of Naval Research (ONR) provide the balance: DARPA $20 million or about 45%; ONR $4 million or about 5-10%. These agencies tend to concentrate on large projects in a small number of institutions, with a sharp focus on defense applications. NSF, on the other hand, supports research in a broad cross-section of institutions, and emphasizes fundamental research on non-defense applications, such as scientific databases, information retrieval, and collaboration technology, control of remote scientific instruments, aimed at improved productivity in science and engineering.

INDUSTRIAL RESEARCH ON INFORMATION TECHNOLOGIES

SENATOR MIKULSKI: You indicate that industrial labs use this research, but that they focus generally on short-term research goals. (CISE, 12) Besides any support for NSF Science and Technology Centers in this field, how much support does industry provide for basic research?

ANSWER: At this point none of the NSF's Science and Technology Centers has a direct focus on the application of Artificial Intelligence or Information Technologies in general. Many of the industrial giants do have laboratories to look at the innovative use of information technologies - IBM, Digital Equipment, Texas Instruments, General Electric, for example. Very few, however, provide continuing, direct support to universities for un-restricted basic research. One notable exception is the industrial matching funds for Presidential Young Investigators, which amount to about $0.5 million yearly in this subactivity.

EXPERIMENTAL SYSTEMS AND SYSTEMS PROTOTYPING

SENATOR MIKULSKI: Your FY 90 budget for Microelectronic Information Processing System includes nearly $9 million for experimental systems and systems prototyping fabrication, a growth of almost 50% over the FY 89 levels for both programs (CISE 14-16) Your justification suggests this will help expand the work of various U. S. universities in both areas. At which universities will this effort take place and what will be the direct benefit to our economy from this work.

ANSWER: Today there are about 30 U.S.universities with the capability to design, build, evaluate, and experiment with new information processing systems, and fewer than 100 which have adequate teaching capability. These include both large and small State and private Universities from across the nation. The requested increases will encourage the innovative design of new information processing systems, and the training of students in experimental systems research. While we plan to continue to support established research institutions, we have as a major priority initiating both research and education at additional institutions. Our goal is to add from 10 to 15 research awards at new institutions and to introduce VLSI curricula to about 30 new institutions in 1990. These awards will be determined by competitive proposal review.

Competitiveness in microelectronics depends upon reducing the time it takes to bring newly designed products to the marketplace. This research activity supports research on new methodologies, tools, and design environments needed to shorten the time it takes to prototype a design of a new system. The curriculum/training activities expand the human resource base with adequate experience in designing and testing real systems. University/industry collaboration in both the Experimental Systems program and the Systems Prototyping and Fabrication program is encouraged to further technology transfer to U.S. industry.

INCREASE FOR NETWORKING AND COMMUNICATIONS RESEARCH

SENATOR MIKULSKI: NSF's request of $7.5 million for networking and communications research represents an increase of $3.45 million, a growth over last year of 85%. (CISE-24) Why is there such a large increase in one year?

ANSWER: Major increases are required to support new basic research on very high speed networking required for the computer communications networks of the future. This includes topics such as switching, routing, network control and protocols, some of which will be supported jointly by several agencies. It is also necessary to strengthen other aspects of the current program since at present only 10% of new proposals can be funded, and we are unable to respond adequately to needs for research in such essential areas as efficient protocols for fiber-optic networks, communications signal processing, and algorithms and implementations of schemes for improved communications security.

INCREASE FOR ADVANCED SCIENTIFIC COMPUTING

SENATOR MIKULSKI: Your request for advanced scientific computing would jump by over 28% under the NSF's FY 90 budget to nearly $72 million, over FY 89, and an increase over FY 88 of nearly 60%. Why is such a large increase proposed for this activity?

ANSWER: These increases are all associated with the NSF Supercomputer Centers Program. From FY 88 to FY 89, the increases were used to meet original commitments to fully staff and outfit the five Centers. The $20 million increase in the Centers Program from FY 89 to FY 90 is primarily for upgrading the Centers' supercomputer systems.

INDUSTRIAL PARTICIPATION IN SUPERCOMPUTING

SENATOR MIKULSKI: As you've indicated in your budget justification (CISE,20), part of the proposed supercomputer enhancement will go for advanced research projects involving industry and universities. Why can't we expect the private sector to do more in this area, particularly given the enormous payoff that technological breakthroughs in supercomputing are supposed to have?

ANSWER: We do expect the private sector to do more, and the request assumes that they will do so. Over the first 5 years of the program, the involvement of vendors and industry has grown steadily and we expect this trend to continue in the future. The extent of the involvement is measured by cost-sharing, collaboration with industry and vendors and the number of users from industry. In the period FY 1985 - FY 1989, industry and vendors provided about $90 million in cost-sharing (cash and in kind) to the national centers. The contributions were provided primarily by vendors in the high performance computing arena who view involvement with the program as a means of developing a user and applications software base that adds enormous value to their hardware and software products. Other industries in such areas as biotechnology, aerospace, and materials science have contributed up to $1M per year.

UNDERGRADUATE EDUCATION AND SUPERCOMPUTER CENTERS

SENATOR MIKULSKI: Part of your '90 budget enhancement for supercomputing will go for expanded training and outreach to other research computing centers and for undergraduate educational opportunities. My question is two-fold: Could you describe what these outreach activities consist of and how many undergraduate students will benefit directly from the additional funds you're requesting?

ANSWER: Each of the national centers has extensive training and educational activities which are a major part of their day to day operations. The activities include training courses and workshops, subject-specific seminars and colloquia, consultant "hot-lines", on-line documentation, help and example files, student intern programs, regular scientific research reports and user newsletters, and educational programs to integrate supercomputing into the regular academic curricula at affiliate institutions. Outreach in these activities is achieved primarily through the academic affiliate programs. Beginning in 1990, we intend to cast the activities into a more national character to better serve users of state and local facilities. This will involve more coordination between the Centers and creating mechanisms for extending training activities to state and local facilities.

Undergraduates have been an important part of these activities. About 200 have worked at the centers as interns and through the Foundation's Research Experience for Undergraduates (REU) program. About 5% of participants at training courses and workshops were undergraduates. Many have used the supercomputing resources at the centers as part of their academic course work in numerous disciplinary areas. The requested additional funding is expected to significantly increase undergraduate participation.

SENATOR MIKULSKI: Are the students who participate in this program more inclined to go into teaching, research or industry?

ANSWER: We do not currently collect data on subsequent employment of students who use the centers. They were from over 40 distinct disciplinary areas, and it is likely that the profile of employment for student users of the supercomputer centers corresponds roughly to that of their respective disciplines.

ACCESS TO NON-NSF SUPERCOMPUTER RESOURCES

SENATOR MIKULSKI: The FY89 Appropriations Act directed that $1.5 million be available to support proposals for access to computer capabilities not available at the national supercomputer centers. Where does that effort stand?

ANSWER: In accordance with this direction, NSF is supporting requests for access to computing capabilities required as part of research projects. Program directors in the research directorates reviewing proposals, or processing current awards containing requests for computing capabilities outside the NSF Supercomputer Centers, were informed by an internal memorandum regarding the availability of funds to support such resource requests. The Division of Advanced Scientific Computing has been working with program staff to identify projects to receive this support. At this time, over $1.5M in pending awards are planned in areas such as special purpose high performance computers, mass storage systems, visualization systems and access to supercomputers for physics, chemistry, biology, engineering and the atmospheric sciences.

PH.D. MOVEMENT INTO ACADEMIA AND INDUSTRY

SENATOR MIKULSKI: Two of the major accomplishments that you cite in the agency's work in Computer and Information Science are doubling the numbers of Ph.D.'s in this field over the last eight years and increasing the number of faculty in computer science testing and research. (CISE, 26). Of the new people trained in this area since NSF's participation, how many have gone into teaching and how many into research?

ANSWER: NSF has provided some support for academic computer research since before 1970. However, the CISE Institutional Infrastructure program (and its predecessor) was initiated in FY 1980, with the goal of alleviating a documented shortfall of PH.D.'s in both universities and industry. Of the 2030 Ph.D.'s graduated in Computer Science and Engineering since 1983, 973 have taken academic positions and 711 have gone into industry, primarily in research laboratories. (The remainder are split among government, self-employed, returnees to their own country, and "other".) Those in academic positions are generally involved in both teaching and research. The division of work between the two areas varies among institutions but 40% in research, 50% in teaching and 10% in service activities is a nominal allocation in many institutions.

EXPANSION OF INSTITUTIONAL INFRASTRUCTURE PROGRAMMING

SENATOR MIKULSKI: Why do these particular results justify a nearly 27% increase in your computer information science institutional infrastructure budget for FY 90?

ANSWER: The Institutional Infrastructure program has been successful and is to be extended to smaller schools and minority institutions. Most new Support in this program is directed specifically into educational infrastructure activities which span the whole CISE Directorate. A new Educational Infrastructure activity is planned, to provide support for curriculum development, laboratory hardware and software, and faculty development. Each project is to be led by a senior educator/researcher, and produce materials which can be used by the broader national community. In addition, specialized educational workshops and faculty development programs will be supported.

SENATOR MIKULSKI: Part of your proposal for increasing supercomputer research is so you can expand your efforts with minority institutions (CISE 27,28) (a) How much of your proposed increase do you specifically intend to spend on minority institution participants?

ANSWER: (a) Of the proposed increase, up to $1M is planned for programs involving minority institutions.

SENATOR MIKULSKI: (b) If an institution has no particular expertise in this area, how would you propose that they become a participant?

ANSWER: (b) The efforts with the minority institutions are directed at building up overall capabilities in computer and information science and engineering, not in any single area such as supercomputer research. Support is being directed at building up their infrastructure, broadly defined, i.e., to include faculty development, course and curriculum development, laboratory enhancement, and research facilities upgrading. Development of such capabilities will allow the institutions and the individuals to participate effectively throughout the spectrum of CISE supported activities.

SUPERCOMPUTER CENTER UPGRADES

SENATOR MIKULSKI: Last year, this subcommittee endorsed the budget request of $56 million for supercomputing. That represented an increase of about $11 million over the 1988 level. The FY 1990 budget requests almost $72 million for supercomputing which is almost a 30% increase over the 1989 level. Most of this increase is for the renewal or upgrade of the existing national supercomputer centers. If the committee is able to provide the budget requested, would this be enough to upgrade all five centers and if not, how will you decide which centers to upgrade? Where does the upgrade competition stand?

ANSWER: If the Supercomputer Centers Program receives the FY 1990 budget which has been requested, all five supercomputer centers will be extended through FY 1995. In addition, we will be able to support the upgrading of four centers starting in FY 1990. The fifth was recently upgraded and has no additional upgrade needs in FY 1990. The renewal and upgrade of the centers is currently under review. A three phase, hierarchical review process is underway, consisting of: 1) mail reviews, 2) site visits, and 3) a review panel. To date, the external review has been completed, and negotiations are underway to prepare a recommendation to the National Science Board, which must authorize the required expenditures. Upgrades are of the highest priority to provide leading edge supercomputing capability to the research community. If the budget request is not met, we would either not support an upgrade at one (or more) of the centers until a later date, or terminate one or more of the centers. As the NSF portion of the whole Center's program cost is at present about one-half of the actual costs at the Centers, a good deal of negotiation is necessary before the final shape of the program can be determined.

NETWORKING

SENATOR MIKULSKI: How does your request for computer networking relate to the White House Science Office's report of 1987 which focused on an R&D strategy for high performance computing?

ANSWER: The request is "stand-alone" in the sense that NSF and several agencies have already begun the cooperation envisioned in the OSTP report, in advance of any new initiative. The growth of NSFNET both in services offered and in number of institutions served is more rapid than envisioned in the 1987 report, partly due to the cooperative efforts of the participating agencies (NSF, DARPA, DOE, NASA). Additional planning on how best to implement the Strategy is presently underway in OSTP.

SENATOR MIKULSKI: NSF plans to upgrade NSFNET, a network of computer networks that was developed to provide access to the NSF supercomputer centers for the national computational science community, to 45 megabits per second in FY90. This is one of the principal reasons you are asking for a 54% increase, $9.5 million, for Computer Networking and Communications Research. In addition to fulfilling the original plan under which it was instituted in the fiscal year 1988, why will that upgrade be necessary?

ANSWER: The requested increase for Networking and Communications Research and Infrastructure is to continue to operate NSFNET, a growing network of networks, and to increase the support for basic and applied research in this area. Improving the performance of the NSFNET backbone by adding new nodes and increasing the speed of parts of the backbone accounts for part of the increase. Enhancing critical network information services, continuing to assist the mid-level networks, and connecting more institutions are other parts.

SENATOR MIKULSKI: Could you identify examples of specific prospective accomplishments to be achieved by a 45 megabits per second speed for NSFNET?

ANSWER: The principal accomplishment will be to maintain high quality service by avoiding overload and congestion on the NSFNET backbone (which aggregates the traffic from all the mid-level and campus networks). Backbone traffic is rapidly increasing in volume, and the current 1.5 megabit Backbone is likely to begin experiencing congestion during 1990. Another is to take advantage of new offerings of the telecommunications companies from which transport service is purchased. Finally, the higher capability will allow introduction of new scientific and educational applications not hitherto feasible on the slow or congested networks of the past, such as interactive graphics for "visualization" of research phenomena which are an emerging product of advanced supercomputing.

SENATOR MIKULSKI: Part of this request will extend this system from 240 to 400 institutions. Are all of these institutions academic, or are some from industry as well?

ANSWER: NSF will focus support of additional educational institutions. But the growing connectivity provided by the network is attractive to the entire nation's research community, so many will be from industry, both for-profit as well as not-for-profit firms.

SENATOR MIKULSKI: How will these institutions be selected? Will they provide any reimbursement to the agency for the use of these network?

ANSWER: Academic institutions will be selected based on review of proposals which state the need for the connection. They do not provide reimbursement to the agency for the use of the network, but they do provide a significant cost-sharing for a part of the network. They directly support the regional, mid-level networks and totally support the networks and computers that connect to it at their own institutions. Industrial firms typically fund all costs of connecting to the network. Each campus is expected to provide the network connections from the campus gateway to the user. The aggregate of these costs, and thus the actual investment of the user community, is many multiples of the federal contribution to the backbone and mid-level networks.

SENATOR MIKULSKI: What will be the cost of upgrading NSFNET to a 45 megabit speed?

ANSWER: The exact cost for upgrading the entire backbone is not known at this time because the network is expanding and the prices for the required switching machinery has not yet been established.

SENATOR MIKULSKI: How soon after the start of the fiscal year will the upgrade take place?

ANSWER: Since the request was made, NSFNET has been restructured and extended to meet growing traffic pressure and accommodate the needs of the participating partner agencies. The present request thus would not upgrade the entire backbone network to 45 megabit speeds in 1990. We would begin immediately to make such upgrades (to 45 megabit speeds) in the parts of the network backbone which require that capacity, and complete the upgrade in 1991.

MINORITY RESEARCH CENTERS OF EXCELLENCE

SENATOR MIKULSKI: For the second year in a row the Minority Research Centers of Excellence Program is level funded at $5.8 million (STIA-17). At present you have made 6 awards over the last two years in this program. Why are no new awards proposed for FY90?

ANSWER: The Minority Research Centers of Excellence (MRCE) effort is designed to assist those institutions that currently have developed their research infrastructure to the level of a center. At the present time only six minority institutions, based on the Foundation's merit review, are at this level and able to take advantage of the MRCE program. While no new MRCE awards are proposed for FY 1990, over the next few years we will assist additional minority institutions in achieving MRCE status through expanded research improvement initiatives and a new alliances effort.

SENATOR MIKULSKI: You made the awards for these centers in September, 1988. Prior to these awards, NSF gave out $675,000 for nine planning grants, for what were supposed to be promising proposals, but that ultimately none of the nine were selected. Shouldn't the Foundation be managing planning grant awards better so that some of the funds are used for projects that move towards actual development?

ANSWER: Planning grants were made by the MRCE program to help institutions assess their current status in science and engineering areas supported by the NSF and to develop a long-term enhancement plan. The Foundation did not intend to limit planning grant awards to only those institutions that it felt could successfully compete for full MRCE implementation awards. The Foundation neither promised nor expected success for everyone in the full competition for the MRCE program. We are now encouraging institutions to submit those strong research components that were developed during the planning process to the Research Improvement in Minority Institutions (RIMI) program.

SENATOR MIKULSKI: Only one of the current Minority Research Centers is a Historically Black College. What are you planning to do to increase the number of HBC's in NSF's work?

ANSWER: Actually three out of the current six MRCEs are Historically Black Colleges or Universities (HBCUs), Alabama A&M University, Howard University, and Meharry Medical College. The Foundation will continue to work with all institutions that have significant minority enrollment, including the HBCUs, through its regular disciplinary programs and its targeted initiatives for minorities. We recognize the important and unique role that HBCUs play in educating minority scientists and engineers.

SENATOR MIKULSKI: What is the difference between the Minority Centers of Excellence program and the Research Improvement in Minority Institutions program. And why is the latter program also level funded for the third year in a row (STIA-20)?

ANSWER: The MRCE program is designed to develop the research and training programs at the most research productive minority institutions. The program provides support to those research groups in minority institutions that are at or close to the cutting edge of research in critical science and engineering areas. The MRCE program is the flagship of the NSF research and training enhancement programs for minority institutions and requires a significant research base.

The Research Improvement in Minority Institutions (RIMI) Program provides support to eligible institutions to improve and strengthen their capabilities in areas that have promise of being competitive in the regular programs of the NSF and where significant enhancement can be made in the departmental infrastructure and in the ability to train students for science and engineering careers. Awards are more modest than under the MRCE and generally tend to be narrower in scope. The current level of funding for RIMI has kept pace with the number of competitive proposals. The success ratio in the program has been around 50 percent. In this regard, the RIMI program limitation of allowing only one proposal per institution per year has been removed. This should increase the number of supportable proposals and the ability of the NSF to consider increasing the RIMI allocation in future years.

SCIENCE AND TECHNOLOGY CENTERS

SENATOR MIKULSKI: The Science and Technology Centers program began in FY 1989 with awards for 11 centers and the use of $25 million from NSF. You are requesting an additional $20 million for 8 to 10 new Science and Technology Centers in FY 90. (STC-5,6) Given the lack of time to evaluate the first centers established in FY 89, why should we fund a second round of centers next year?

ANSWER: Three hundred and twenty three (323) Science and Technology Research Center (STC) proposals were received and reviewed in detail in FY1988 and forty eight (48) finalists were identified. Final review and funding of eleven (11) new STCs was delayed, however, until FY1989 due to budgeting constraints in FY1988.

The highly competitive STC program evolved from NSF's experience with the Material Research Laboratories (MRLs) which started in FY1972 and the Engineering Research Centers (ERCs) which were initiated in FY1985. Thus, the STC program is extending the support mechanism demonstrated to be important to engineering and materials science, to other research areas that now require this form of investment to insure fully competitive multi-disciplinary research programs. The STCs, like the MRLs and ERCs, often serve as sites for unique and highly specialized instrumentation that is not readily available to campus research activities. This instrumentation will contribute to improving the training environment for the students and prepare them more directly for technical positions over the next 10-15 years.

Prior to proceeding with a second competition, the NSF awaited the NSB evaluation of the existing ERCs and for the NSB review of the initial 11 STCs. After this review was completed and the final group of STCs were reviewed by NSF senior management (Director, Deputy Director, and Assistant Directors), it was agreed that there were at least 20-25 additional STCs of such high quality that further investment was needed. Given the long time since the original submission (January 1987), it was agreed that the proposals identified as finalists should not be held over for funding; rather, another competition was needed to take advantage of the achievements and breakthroughs in other fields (i.e., cold fusion). It was also agreed that delaying further a second STC competition would put our research activities in a far more constrained environment with respect to the international research community.

SENATOR MIKULSKI: One of the centers started is a center for the analysis and prediction of storms. It would appear that this center may overlap with much of the work of the National Center for Atmospheric Research which NSF has supported for many years and for which you are requesting almost $50 million in FY 1990. NCAR has a climate program as well as a meteorology program that presumably do work in storm analysis. How does this STC differ from NCAR and why is it appropriate that NSF support this center as opposed to the National Weather Service?

ANSWER: Research at the Center for Analysis and Prediction of Storms (CAPS) is focussed on, but not limited to, the predictability of severe weather such as heavy rainfall, hail, high winds and tornadoes in the central United States. CAPS researchers will begin with a continental size mesoscale weather forecast model of moderate resolution and telescope it to the smallest time and space resolution needed to identify and forecast severe weather elements. This will require development of advanced numerical and data assimilation techniques and the use of the most advanced computer architecture.

The National Center for Atmospheric Research (NCAR) has various weather and climate models, none of which are used to forecast severe weather on the same scales as CAPS. NCAR researchers are involved in all aspects of mesoscale modelling, but on larger time and space scales than is CAPS. Nevertheless, there is active interaction between the two groups and they support and use each others findings in their own work.

A unique aspect of CAPS is that it is a research center supported jointly with the National Oceanic and Atmospheric Administration (NOAA). As such, it will be able to transfer research results from CAPS directly to the National Weather Service where it will becomes available to all users of weather forecasts. Transfer of ideas and technology to the National Weather Service are more difficult at NCAR.

Finally, CAPS has an strong educational component as a part of the University of Oklahoma where future researchers are educated and trained in many aspects of severe weather phenomena. Such a component does not exist at NCAR nor within NOAA's National Weather Service.

SCIENCE AND TECHNOLOGY CENTERS

SENATOR MIKULSKI: Another Science and Technology Center at Rice University is for research on parallel processing. How does this relate to the five National Supercomputer Center?

ANSWER: The Science and Technology (S&T) Center at Rice University and the five NSF Supercomputer Centers have quite different "missions" but are complementary. The five NSF Supercomputer Centers provide access to state of the art computing power for a national community of scientific and engineering users from all the disciplines supported by the NSF. This involves the very highest speed general purpose commercial supercomputers. The newest of these machines have a small number (4-8) of central processing units. In principle, these can be used simultaneously (in parallel) to work on parts of a single problem, thus increasing the capability (speed to solution of the computer. In practice, this happens very seldom, and the machines operate multiple job streams, one to a processor, increasing the capacity instead. Innovative methods (algorithms) and software are required to improve capability by using processors in parallel, and that is what the Rice (and its collaborators at Cal Tech and Argonne National Laboratory) STC is about.

The Rice S&T Center is focused on the science of the emerging area of parallel processing. Still in its infancy, parallel processing holds the promise for major advances in the field of computing, but much basic research needs to be done. New parallel computers consist of from hundreds to tens of thousands of processors which are slower and less expensive than those in the newest conventional supercomputers. These machines are generally less expensive than conventional supercomputers, but in some applications are as capable. Using them effectively to solve a large array of scientific problems is the goal of the S&T Center at Rice. Ultimately it is expected that the techniques and methodologies developed at Rice will feed into the supercomputer centers in the future, speeding the expected power of parallel computers available to the national scientific community.

VERY LONG BASELINE ARRAY TELESCOPE

SENATOR MIKULSKI: NSF is requesting $400,000 to continue construction of the Very Long Baseline Array Telescope in FY 90, with a revised completed construction date of 1993. (MPS-17) The completion date a year ago was 1991, which itself was a revision of the original completion date. Why has the completion date for this project slipped another 2 years?

ANSWER: The request for Very Long Baseline Array construction in FY 1990 is $12,400,000. The anticipated completion date of FY 1993 has not changed since 1987, although there was stretch out in construction in FY 1985 and FY 1986, in accordance with Congressional direction.

SENATOR MIKULSKI: What are you proposing to do to avoid further slippage?

ANSWER: There has been no slippage since 1987, and none is expected provided budgets remain stabilized.

SENATOR MIKULSKI: What do you now estimate the total cost to complete this project is, and how does it compare with the cost of completion when the date was 1991 and with your original date estimate?

ANSWER: Since 1987, the estimated total cost to completion has been approximately $81,000,000 (current year dollars). The original National Science Foundation Budget Request for FY 1985 was based on a construction schedule which would have resulted in project completion in 1990 at a cost of $61,500,000 (FY 1985 dollars). Congress limited funds available to VLBA in FY 1985 and FY 1986, thus funds were not sufficient to maintain the original schedule.

U.S. ANTARCTIC PROGRAM (USAP): ENVIRONMENTAL, HEALTH & SAFETY

SENATOR MIKULSKI: The 1990 budget requests $10 million as the first increment in a 5 year $180 million environmental, health, and safety initiative for the U.S. Antarctic Program. (USAP-3) Exactly what is in this initiative and how did we get ourselves into a situation that will obviously be extremely expensive to rectify?

ANSWER: The goals of the initiative are: Safety--to achieve year-round operations in the Antarctic with modern technology and acceptable risk; Environment--to clean up the debris of past operations, and to bring present operations into agreement with current regulations, prevailing attitudes, and current technology;Health--to improve medical facilities and to provide field parties with safety experts who have medical training.

This initiative responds to the recommendations in two reports. These are "Safety in Antarctica," the report of a special antarctic safety panel appointed by the NSF Director, and the National Science Board's report "The Role of the National Science Foundation in Polar Regions." While the U.S. Antarctic Program has attempted to deal with problems in these areas in the past, resources have been inadequate, and a number of serious problems exist, including waste disposal, environmental monitoring, air traffic control and precision landings, communications, and emergency facilities.

The Presidents's FY 1990 Budget Request includes $10 million toward this effort. Over half of this initial increment is for environmental activities, with the balance earmarked for safety- and health-related improvements. The total package is expected to approach $100 million over 5 years, exclusive of aircraft acquisition which will be subject to special review before being proposed to the Congress. Of this amount, over $30 million will be used to improve environmental protection.

While a portion of the program is required to remedy environmental and safety deficiencies from the past, the bulk of it is required to make the future program safer and more environmentally sound. The program builds on actions of the past several years such as the replacement of temporary living facilities with modern dorms, the start of an upgrade program for the LC-130 aircraft, and significant environmental clean-up activities at McMurdo and Palmer Stations.

Our challenge now is to meet recognized needs such as environmentally sound disposal of liquid and solid wastes and environmental monitoring; to improve medical facilities, search and rescue, and fire suppression; and to upgrade deteriorating facilities, particularly at the U.S. South Pole station.

SENATOR MIKULSKI: Who is principally responsible for allowing conditions to deteriorate where a major initiative is needed for health and safety cleanup?

ANSWER: The initiative addresses future needs as well as remedying past problems. The source of some current needs can be traced to the 1970s when funding responsibility for logistics, construction and procurement was transferred from the Department of Defense to the NSF, but funds were severely constrained.

ANTARCTICA PROGRAM: INTERNAL CONTROLS

SENATOR MIKULSKI: A GAO report of September 1988 says that the NSF may have weaknesses in internal controls of its Antarctica program. Specifically, the report says that NSF has no plans for conducting internal control reviews of logistic support of the USAP. (National Science Foundation: Allegations of Waste Within the U.S. Antarctic Program - GAO/RCED-88-223BR - p.3) In response to the GAO findings, NSF indicated that it would consider performing such a review of the USAP. Has such a review been conducted?

ANSWER: A more precise statement of this part of NSF's response to the GAO is the following paragraph of my letter of 31 October, 1988 to Flora H. Milans, Associate Director of the GAO: "Although no formal internal control reviews have been conducted on logistics support for the Antarctic Program, several recent and scheduled reviews of the Program do contain internal control components. The recently concluded U.S. Antarctic Program Safety Review Panel made several recommendations concerning increased NSF oversight of operations. The NSF Five-year Management Control Plan includes a review of Polar Coordination and Information activities in fiscal year 1991. The Division of Polar Programs is improving internal controls through increased oversight and communication of requirements to all concerned staff, contractors, and agencies."

More specifically, the Division of Polar Programs is provided opportunity for input to Navy audits that cover topics such as inventory control and motor vehicle disposition. It uses these opportunities to obtain independent review. In addition, it is taking measures concerning independent oversight of construction by the support contractor. This past season a construction manager was appointed through the Pacific Division of the Naval Facilities Systems Command to oversee construction of the science laboratory.

SENATOR MIKULSKI: How does NSF intend to institutionalize its ability to have some sort of internal controls on its logistic support of the Antarctic Program?

ANSWER: With reference to another point in the 31 October 1988 letter to the GAO, we continue to think that on-site representation is important, and we currently plan to establish a year-round NSF representative in connection with this and other requirements.

SENATOR MIKULSKI: Could this be a possible area for the new IG to examine?

ANSWER: It is a possible area for the new IG to examine.

U.S. ANTARCTIC PROGRAM (USAP) RESEARCH

SENATOR MIKULSKI: Much of USAP research is of global significance (e.g., examining the biological effects of increased ultraviolet radiation due to ozone depletion. (USAP-5) The budget request states that cooperative research programs with scientists of other nations are commonplace. (USAP-4) If this is true, what kind of research are other countries doing that is in line with the U.S. Antarctic program goals?

ANSWER: Cooperative research responds to significant common objectives and cuts across scientific disciplines. For example, Argentine and Chilean scientists join with those of the U.S. in studies of biological effects of increased ultraviolet radiation. The Antarctic "Ozone Hole" that results in increased ultraviolet radiation reaching the Earth's surface was discovered by the British working at their Halley Station. With respect to change in global climate, ice cores provide the most detailed record of climate history over the last 125,000 years, with increased detail for the more recent past. This climate history provides one important basis for the predication of future change. Soviet, French and U.S. scientists are involved in studies of deep ice cores obtained by the Soviets at their Vostok Station, and U.S. and British scientists will soon initiate an ice coring project in the Antarctic Peninsula.

SENATOR MIKULSKI: To what extent are our Antarctica research efforts coordinated with other countries?

ANSWER: International coordination and multinational science are commonplace, in part because of shared logistics, which requires coordinated planning of science projects, in part because of the relatively small numbers of scientist working in Antarctica, and because scientific cooperation was, and is, a key basis of the Antarctic Treaty.

ANTARCTIC ICEBREAKER PROCUREMENT

VESSEL SAFETY STANDARDS

SENATOR MIKULSKI: NSF's Antarctic contractor, ITT, has said that U.S. shipping safety standards should not have to apply to all proposals submitted for this procurement because the icebreaker will not technically be a government vessel, because NSF is funding this under contract with them. Isn't it true, however, that even if you lease this ship and someone else puts up the construction funds, NSF will end up paying for construction of the vessel through its annual operating payment?

ANSWER: The vessel owner would presumably recover costs, following normal business practices. As you may know, the RFP provides for a ten-year lease with an option for NSF to purchase the ship after ten years.

SENATOR MIKULSKI: So isn't it true that ITT's assertion is somewhat misleading because NSF will in fact have to end up footing the bill?

ANSWER: While the government will indeed foot the bill, ownership will only be acquired if the option to buy is exercised after ten years.

SENATOR MIKULSKI: I understand that the real reason for concern over requiring all proposals to meet U.S. Coast Guard vessel standards is our GATT agreement. Is this true?

ANSWER: To the best of our knowledge, the GATT has not been directly involved in vessel standards in connection with this procurement. The RFP states (General Requirements, p.5) that the safety and construction (suitability for antarctic service) are the two most important factors to be evaluated, ahead of all other technical as well as cost considerations.

SENATOR MIKULSKI: But this potential GATT problem does not create a binding legal requirement that NSF give this vessel standard waiver to foreign bidders, isn't that true?

ANSWER: As stated above, to the best of our knowledge the GATT has not been directly involved in vessel standards in connection with this procurement. The RFP states (General Requirements, p.5) that the safety and construction (suitability for antarctic service) are the two most important factors to be evaluated, ahead of all other technical as well as cost considerations.

SENATOR MIKULSKI: My concern is that you could end up in court on this procurement because you don't require Coast Guard certified vessel standards on all bids and that will delay this procurement even further. Moreover, imagine the worst and that this vessel, which might not have standards certified by the Coast Guard, runs aground or is lost. Don't you think that exposes the Foundation to possible significant public embarrassment and potential financial liability, particularly if someone is hurt or killed at sea?

ANSWER: The RFP states (General Requirements, p.5) that the safety and construction (suitability for antarctic service) are the two most important factors to be evaluated, ahead of all other technical as well as cost considerations.

NSF's contractor has assembled an evaluation team with considerable experience, and they will use USCG standards as a bench mark. The vessel selected as the result of the competition must meet our requirements for safe service in the Antarctic.

SENATOR MIKULSKI: I know you think that a U.S. bidder is going to win this procurement in all likelihood because of last year's provision. But how will you factor in the cost of Coast Guard vessel standards into those non-U.S. bids when evaluating all submitted proposals?

ANSWER: We expect that any successful bidder will exceed the safety requirements; there will be no cost savings through reduced safety standards. The RFP states that safety of the vessel takes precedence over cost considerations.

PROTECTING U.S. SOVEREIGNTY OVER ANTARCTIC RESEARCH

SENATOR MIKULSKI: We added our Buy America provision last year because we committed to our U.S. shipyard mobilization base, which has lost 119 yards since 1981, four in my own hometown of Baltimore. We also recognized that the benefits of NSF's research in the Antarctic are primarily for the United States, so that a U.S. vessel guarantees maximum protection of our national sovereignty over whatever research is gathered on it. Under the terms of this RFP is it possible that an award could be made for a Soviet flag vessel to be operated by a Soviet captain and crew, which is a real possibility since the Soviets have the largest icebreaker fleet in the world and could conceivably enter the competition for this ship?

ANSWER: Under the terms of the RFP, which was developed in strict accordance with the FY 1989 Appropriation Act and accompanying report language, it is possible that a foreign vessel could be selected. A

Soviet vessel is not a realistic possibility. While the Soviets have many icebreakers, few were built in that country. Further, we are seeking a research vessel, not an operational icebreaker. The Soviets did not participate in the previous competition nor have they made any inquiries of NSF's contractor about the current procurement.

SENATOR MIKULSKI: Isn't this possibility somewhat contradictory of our own national interests?

ANSWER: As noted above, we believe that a Soviet vessel is not a realistic possibility. While the Soviets have many icebreakers, most of them built in Finland, we are seeking an operational research vessel with limited capability to break ice, a very different type of ship.

DETERMINING FOREIGN SUBSIDIES

SENATOR MIKULSKI: In your evaluation of proposals from any foreign sources, will you analyze all forms of subsidy, both direct and indirect subsidies, such as

1) Preferences for steel and other materials and equipment,
2) tax benefits (including depreciation),
3) government participation,
4) grants,
5) export credits,
6) customs duties,
7) contributions to research,
8) wage rates, including wage and hour requirements,
9) quality control and construction standards,
10) compliance with (a) environmental regulations
    (b) affirmative action programs
11) and all other federal requirements for government contractors.

ANSWER: The Department of Commerce (DOC) has developed the expertise for determining the existence and amount of subsidies in this area, and it has been well tested in the past. NSF, through our contractor's RFP, is requesting all bidders to supply detailed information concerning any subsidies that may be associated with the particular bid. Once NSF has received this information, we will make it available to DOC so that they can make any necessary subsidy determinations.

SENATOR MIKULSKI: The Request for Proposals in this procurement waives a number of standard Government contract clauses for foreign bidders, like the Clean Air and Water Acts, and equal opportunity and affirmative action laws. (See next page for entire list) How will NSF review non-U.S. proposals to guarantee that the enhanced cost of these requirements to U.S. bidders does not become a disadvantage in analyzing their proposals?

BIDDING REQUIREMENTS

NOTE: Clauses without an asterisk are applicable to all bidders. Clauses marked with an asterisk (*) are applicable only if construction of the Vessel is performed in the USA. Clauses marked with a double asterisk (**) are applicable if construction of the Vessel is performed in the USA or if the Vessel is of USA Registry.

Attachment (From RFP)

CLAUSES INCORPORATED BY REFERENCE (APR 84), Continued

	51.215-24	Subcontractor Cost or Pricing Data (APR 85)
	52.215-25	Subcontractor Cost or Pricing Data modifications (APR 85)
*	52.219-8	Utilization of Small Business Concerns and Small Disadvantaged Business Concerns (JUN 85)
*	52.219-9	Small Business and Small Disadvantaged Business Subcontracting Plan. (APR 84)--Alternate (APR 84)
*	52.219-13	Utilization of Women-Owned Small Businesses (AUG 86)
*	52.220-1	Preference for Labor Surplus Area concerns (APR 84)
*	52.220-3	Utilization of Labor Surplus Area concerns (APR 84)
*	52.220-4	Labor Surplus Area Subcontracting Program (APR 84)
	52.221-1	Notice to Government of Labor Disputes (APR 84)
*	52.222-3	Convict Labor (APR 84)

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*	52.222-3	Convict Labor (APR 84)

*	52.222-20	Walsh-Healey Public Contracts Act (APR 84)
**	52.222-26	Equal Opportunity (APR 84)
**	52.222-28	Equal Opportunity Preaward Clearance of Subcontracts (APR 84)
**	52.222-35	Affirmative Action for Special Disabled and Vietnam Era Veterans (APR 84)
**	52.222-36	Affirmative Action for Handicapped Workers (APR 84)
*	52.223-2	Clean Air and Water (APR 84)
	52.225-3	Buy American Act -- Supplies (APR 84)
	52.227-1	Authorization and Consent (APR 84)
	52.227-2	Notice and Assistance Regarding Patent and Copyright Infringement (APR 84)
	52.232-9	Limitation on Withholding of Payment (APR 84)
	52-232-17	Interest (APR 84)
	52.232-23	Assignment of Claims (JAN 86)
	52.237-2	Protection of Government Buildings, Equipment and Vegetation (APR 84)
	52.244-5	Competition in Subcontracting (APR 85)
	52.249-14	Excusable Delays (APR 84)

ANSWER: While the initial review of all proposals will be done by our contractor ITT/ANS, working with the Department of Commerce, NSF plans to examine their work to confirm that the 50% cost differential mandated in the Appropriations Act is taken into account. This 50% differential, together with the addition of foreign subsidies identified and quantified by the Department of Commerce, will ensure that U.S. bidders are not handicapped in this procurement by increased costs of ship construction in the U.S. due to mandated regulations, such as the Clean Air & Water Acts, etc.

ANTARCTICA: MAJOR CONSTRUCTION AND PROCUREMENT

SENATOR MIKULSKI: NSF has requested that its Antarctica construction funding be increased by $6.2 million, from $13.9 million in FY 1989 to $20.1 million in FY 1990 (an increase of about 45 percent). This is an ongoing effort to restore or replace obsolete facilities, particularly at McMurdo Station and to a lesser degree at Palmer and South Pole Stations. This includes continued work on projects such as construction of the McMurdo Station dormitory and the science laboratory. (USAP-12) How much of the construction costs are attributable to the McMurdo dormitory and science laboratory?

ANSWER: The dormitory project will include the erection of the fourth building. This is expected to cost $1.7 million in FY 1990. Work on the science laboratory will include continued procurement and enclosing four wings and erection of the steel structure for the fifth wing. This is expected to cost $4.7 million in FY 1990.

SENATOR MIKULSKI: When do you anticipate completion of these two projects and what do you now estimate will be the total cost to complete these two projects?

ANSWER: The first two dormitories are complete; the third is virtually complete. Construction will begin on the fourth in October 1989, and this building is expected to be complete in February 1991. The estimated cost for these four buildings is $15.7 million.

The steel skeleton for four wings of the science laboratory was completed in FY 1989. These wings will be enclosed and the steel skeleton for the fifth wing (aquarium) will be erected in FY 1990. NSF anticipates that most of the building will be complete in February 1992 with partial occupancy during FY 1993, during which time remaining construction will be completed. The estimated cost of this building is $23.0 million.

SENATOR MIKULSKI: What steps are you taking to insure that they will be completed on time and within the current renovation estimates?

ANSWER: The Division of Polar Programs (DPP) reviews the contractor's cost proposals and the proposed schedule annually or more often if changes are needed. This is a key responsibility of DPP's facilities staff. Estimating the costs of construction in Antarctica is more difficult than estimating costs in the U.S. because of severe weather, long distance, and once-a-year surface transportation.

SENATOR MIKULSKI: In October 1988, an RFP was issued for Antarctic Program's logistical support contract. Where does that particular RFP stand and when do you expect to make a decision?

ANSWER: Proposals were received by the NSF's Division of Grants and Contracts on March 31, 1989. All of the proposals are being evaluated both on their technical merits and cost to the government. This process, which will include oral discussions and negotiations with those determined to be competitive, will continue through FY 1989. Award of the contract is expected to be made in October 1989.

ANTARCTICA: OTHER FEDERAL AGENCY INVOLVEMENT

SENATOR MIKULSKI: During the FY 1989 appropriation hearings, NSF indicated that NASA and NOAA contributed to USAP research. Also, the EPA was planning to contribute to an NSF sponsored workshop to determine areas of research needs, standardization of the data collection, and long range plans. (FY 1989 Senate Appropriation Hearings - p. 373) Do you anticipate any changes in the amount of involvement in USAP of these agencies during FY 1990?

ANSWER: We expect NASA and NOAA to continue to participate in Antarctic research. Contributions by EPA toward the understanding of the biological consequences of ozone depletion have thus far been limited to the co-funding of the workshop mentioned, which took place in July 1988.

For example, NASA plans to increase its antarctic involvement through sponsorship of a series of very large (28.6 million cubic foot) balloons to measure rare isotope cosmic ray influx; gamma and hard X-rays from the sun, supernovae and other celestial bodies; and auroral X-rays. These experiments will test and develop technology necessary for measuring phenomena related to the solar maximum anticipated for 1991. Plans call for launching the balloons from McMurdo Station.

SENATOR MIKULSKI: Are these agencies or others expanding their roles in USAP related research?

ANSWER: Yes, particularly in the form of support of specific projects of interest to their agencies' missions, such as NASA's plans for balloon-borne astronomy and astrophysics.

SCIENCE EDUCATION

SENATOR MIKULSKI: Studies of past NSF precollege math and science curriculum development programs have concluded that they were primarily aimed at white male college bound students. What has NSF done to ensure that the mistakes of 1960's will not be repeated? Specifically, in what way has the SEE directorate designed its precollege math and science programs to broaden student participation among minorities and women?

ANSWER: In the 1950's and 1960's, NSF precollege math and science curriculum development programs were aimed primarily at students known or believed to be capable of high performance in those subject matter areas. We know now that that approach actually made these subjects LESS attractive to the vast majority of students, with two serious consequences: first, lower than desired numbers of young people were attracted to careers in science, engineering, and mathematics; and, second, students other than those "shied away" from science and mathematics and thus received general education that was less well-rounded than optimal for effective citizenship in today's world.

In recent years, NSF has moved to correct that error in several ways. For example:

o Each Program Announcement and Solicitation expresses the Foundation's insistence that materials developed for use by students in elementary and secondary school classrooms be appropriate for all students. The following quote, taken from the Instructional Materials Development Program Announcement (NSF 87-12), is typical: "Appropriate activities include, but are not limited to, development of materials that are tailored to the needs of groups such as women, minorities, physically disabled students, college-bound students, those entering the work force immediately following high school graduation, and the gifted and talented."

o Program Officers, when negotiating awards and monitoring projects after an award has been made, emphasize to proposers and project directors that current NSF policy is to broaden the pool of students from which future scientists will be drawn, not just to improve the science potential of students who have already placed themselves in that pool.

SENATOR MIKULSKI: In the past, NSF has been criticized for not including elementary and high school teachers in its precollege math and science curriculum development projects. This concern was raised in the recently released "Project 2061" report, in which the Foundation participated. Does the portion of Foundation's "troika" program involving the development of math and science curriculum materials include teachers at all precollege levels?

ANSWER: The "Publisher Initiative" ("troika program") requires the appropriate and adequate participation from beginning to end of subject matter and materials specialists (scientists, mathematicians, science and mathematics educators), school experts (teachers, specialists, and administrators), and materials distributors (publishers and their in-house experts).

The Initiative has (or will have) components in mathematics and in science, and at specific educational levels (elementary school, middle school, high school). In each case, projects must include teachers among the active personnel.

This is a lesson we have learned well. Under no circumstances would we make a major award to a team that did not include a person who had school experience as a science teacher, administrator, or science supervisor.

SENATOR MIKULSKI: How is this participation encouraged?

ANSWER: The solicitation for Publisher Initiative projects reads in part: "Projects should be staffed by a combination of professionals with the appropriate broad range of knowledge and experience. Each proposal should document the education and experience of project staff in such areas as: science, science education, school policies and procedures, and classroom teaching at the relevant levels.

"Similarly, participation throughout the planning, development, and testing process by one or more representative school systems is required. Proposals should provide evidence of cooperation and commitment of the school systems."

SENATOR MIKULSKI: The Presidential Awards for Excellence in Science and Mathematics Teaching program is being expanded to include elementary teachers (SEE-4). The total funding for these awards is being increased by $.67 million to $2.5 million, an increase of about 35 percent (SEE-8). How are teachers chosen to receive the Presidential Awards for Excellence in Science and Mathematics Teaching?

ANSWER: Each year one science teacher and one mathematics teacher is chosen from the District of Columbia, Puerto Rico, the U.S. Territories, the Department of Defense Dependent Schools, and from each of the fifty states to receive the Presidential Award for Excellence in Science and Mathematics Teaching. The final selections are made by an NSF-convened panel which chooses from among six nominees submitted by each state or other entity.

SENATOR MIKULSKI: From what school systems? Are there target areas?

ANSWER: Details of the selection procedures within each of the 54 jurisdictions are established by local committees, but the competition must be open to all classroom science and mathematics teachers in middle/junior or senior high schools, public or private. Teachers may be nominated by colleagues, by administrators, and by students or their parents.

SENATOR MIKULSKI: What efforts are made to inform schools and teachers about this program and how it is administered?

ANSWER: Information on the program, including nomination procedures, is widely circulated throughout the educational community in each of the eligible jurisdictions. NSF interacts primarily with the state science and mathematics supervisors, providing to them annually over 80,000 descriptive brochures for widespread distribution. NSF also mails some 47,000 informational packages directly to the science and mathematics department heads at every middle, junior, and senior high school in the U.S.. The program is also advertised in over 20 professional journals.

SENATOR MIKULSKI: The FY 1990 request for instructional materials development is $21.5 million, an increase of $3 million, or about 15 percent over the FY 1989 plan (SEE-12). In the FY 1989 Senate appropriation hearings, in response to a question on how its educational materials are distributed, NSF stated that the materials "will be made available to both state and national organizations for dissemination." (FY 1989 Senate Appropriation Hearings - p. 376) How does NSF ensure that the materials NSF prepares are in fact distributed?

ANSWER: NSF-supported materials development projects that do not involve publishers during the planning and early implementation phases nevertheless are required to include in the proposal a comprehensive and credible dissemination plan. To quote from that part of the current Program Announcement dealing with Instructional Materials Development: "Project directors should particularly direct their attention to the potential for widespread implementation and use of their materials. Cost-sharing and the involvement of publishers or other relevant organizations early in the process of materials development is encouraged. The participation of both publishers and school systems is appropriate and valuable, and NSF is actively developing models for such involvement."

Panel reviewers are instructed to pay close attention to how this issue is handled. An award would not be made unless the NSF Program Officer were convinced that a solid dissemination plan was being proposed.

In the case of projects that do involve publishers in the early phase of the project (publisher-initiative projects), the admonition is even stronger and, we believe, the confidence one can reasonably place in the successful execution of the dissemination plan is proportionately greater. The follows statement appears in the solicitation for proposals to develop new elementary school science materials (NSF 87-13): "Each of these projects combines the efforts of:

- outstanding scientists and science educators, who will be responsible for assuring the quality of content and pedagogy;
- a publishing organization, which will contribute a major portion of the investment capital, provide an editorial/marketing perspective throughout the development process, and disseminate the resulting materials; and
- a school system or systems, which will work with the developers to test the materials and to assure that they are useful and successful in a representative school environment.

"In each case, the publisher will make a large capital investment and will set aside a substantial portion of the project income for teacher support to encourage widespread and effective use of the materials."

SENATOR MIKULSKI: It appears that NSF is planning to rely on textbook publishers to play a key role in its dissemination plan. What contingency has the Foundation developed if key publishers fail to adopt NSF-developed materials?

ANSWER: This question calls for different answers for the "Publisher Initiative" projects and for other projects. In the case of the former, publishers invest in early phases of the project and accept a commitment to market the materials aggressively as soon as they have been field-tested and revised.

The situation is more complex -- and less certain -- for other projects. For large projects, the involvement of a publisher when materials are ready for distribution is encouraged. A basis for such collaboration is established by two features of the award processes: first, the Foundation does not make an award unless the proposer has established that there is a need for the final product; and second, the Foundation attempts through its selection and oversight of grantees to assure that the final products will be of high quality.

For small projects -- e.g., the development of a single videotape or some computer software -- it is not necessarily true that a commercial publisher is needed to assure wide dissemination. Sales through university bookstores or professional society executive offices have proven to be very effective on numerous occasions.

The essential feature that protects the Nation from spending federal funds on products that go unused is that the original proposal must contain a dissemination plan. The adequacy of this plan in each case is carefully considered by both external experts and Foundation staff. No award will be made if the plan is judged to be inadequate. The acceptance of an award places a commitment on the awardee to implement the plan; progress in this area is monitored by Foundation staff.

SENATOR MIKULSKI: How does NSF ensure equitable distribution among states or school systems?

ANSWER: The actual geographical distribution of our awards mirrors the population density closely with one exception: Washington, D.C. and its suburbs are overrepresented because those areas are home to the executive offices of professional societies that serve members throughout the United States.

Proposal reviewers are instructed to use merit as the primary consideration in evaluating proposals. They are also told about Foundation goals concerning equity, geographical distribution, and special issues such as the needs of rural schools and inner city schools. Decisions about awards are made ultimately by Foundation staff. The Division of Materials Development, Research and Informal Science Education, does not rank proposals on the basis of average reviewer ratings; each proposal is considered individually using standards of merit and need that have been developed over time. Fortunately, strict adherence to merit produces a spectrum of awards that comes very close to meeting our distribution targets; only rarely have we made an award to achieve an equity or distribution goal that would not have been made if these issues had not been considered.

SENATOR MIKULSKI: Are specific systems targeted (e.g., inner-city schools)?

ANSWER: From time to time solicitations are issued that target specific areas, such as the inner-city school districts.

SENATOR MIKULSKI: The report you submitted to the Committee earlier this year suggested NSF thought it was too early to tell how effective some of its new initiatives were in terms of innovative materials. When do you expect to be able to make some tangible review of these programs that justifies continued funding for them?

ANSWER: The "Publisher Initiative" projects -- a major innovation in the Foundation's curriculum development activities -- were initiated two and one half years ago. Most of these projects will have a five-year development period; thus we are at the half-way point for the earliest round of awards. Accordingly, NSF has initiated a mid-course assessment process.

A panel consisting of ten outstanding scientists and educators is now being assembled. It will examine the goals of this initiative and the progress made toward achieving them -- collectively for the program and individually for each project. The panel is charged also to investigate the efficacy of this approach to instructional materials development. Six months from now, when the panel's work is complete, decisions will be made concerning the continuation or termination of individual projects and about any changes that seem necessary in the program as a whole. Assuming some projects survive this process -- and at this moment we have no reason to believe they will not -- it will be another two and one-half years before the products are ready to be marketed widely. At that time, there will be available numerous objective measures of success: e.g., sales, user satisfaction, and student learning gains.

SENATOR MIKULSKI: According to the budget request, one of the goals of the Undergraduate Science, Engineering and Math program is to conduct "extensive outreach activities with all types of institutions, including two- and four-year colleges and universities, with special emphasis on minority institutions." (SEE-15). What percent of the institutions referred to here are minority institutions?

ANSWER: Most of the USEME outreach activities conducted this year involved minority institutions as either the principal host or as significant participants in the program. In the initial planning of each outreach activity it was stressed to the hosting institution that an important guideline for USEME sponsorship or participation in these activities is the assurance that all institutions in the planned attendance region, including two- and four-year colleges and universities, were invited; further, it was an explicit requirement that special efforts be made to include representatives from minority institutions on the program or as attendees. This special guideline has leveraged the assurance of significant and meaningful minority participation in these outreach activities.

There are approximately 2300 higher education institutions in the United States; of these, about 220 are minority institutions. It is estimated that almost three-fourths of the minority institutions have been engaged by NSF outreach activities during the past year. For example, at an NSF-sponsored meeting in Memphis, Tennessee, the Engineering Deans from five of the Historically Black Colleges and Universities met as a working group and developed a paper on the role of HBCUs in engineering education. This was a part of a meeting sponsored by the Mathematics Association of America and jointly hosted by Mississippi State University, Memphis State University and Tennessee State University.

Other outreach activities were specifically targeted to stimulate participation in the NSF/Comprehensive Regional Centers for Minorities:

- In Baltimore, Maryland approximately 50 representatives of the Baltimore metropolitan area attended an outreach activity hosted by Morgan State University. Representatives from Coppin State, University of Maryland-Eastern Shore, the Community College of Baltimore, Prince Georges Community College, Lake Clifton High School, MESA, industry and city government attended.
- University of Texas at El Paso. Sixty attendees including representatives from the area school systems, city government, business and industry, and community organizations.
- Norfolk State University. Approximately 45 attendees from Norfolk State, Old Dominion University, Hampton University, Norfolk Public Schools, and the CHROME organization.

Other scheduled outreach activities include:

- University of Tennessee-Martin, April 10, 1989. Attendees from approximately twenty small, rural, predominantly undergraduate institutions in the Tennessee, Illinois, Kentucky, Arkansas, Alabama region.
- Clemson University, April 19, 1989. Hosted by Clemson University and the South Carolina Commission on Higher Education. Over 150 attendees from colleges, universities, including the minority institutions, in the six state region of South Carolina, North Carolina, Alabama, Georgia, Florida, and east Tennessee.

There have been many meetings at the Foundation with officials from minority institutions. These meetings included representatives from Fisk University, Jackson State University, Atlanta University, Clark College, Southern University, and Tennessee State University. In addition, increased representation on the NSF Program Evaluation panels by Deans, Department chairpersons, and Faculty from the HBCU institutions has heightened the awareness of NSF programs and indirectly played a role in the USEME outreach goals. The Directorate for Science and Engineering Education participates also in the minority outreach activities of other NSF directorates, e.g. those of the Directorate for Computer and Information Science and Engineering, and the Directorate for Scientific, Technical and International Affairs.

SENATOR MIKULSKI: During the House FY 1989 hearings, it was noted that in a December 16, 1987 Federal Register notice, NSF announced that it was preparing to review its graduate fellowship program. (FY 1989 House Appropriation Hearings - p. 40) The review was not a result of problems in the program, but an attempt to assess the effectiveness of the program as it gets larger. Has the review been completed? If yes, what were the results? If no, when do you anticipate completion?

ANSWER: The review of the Graduate Fellowship Program was completed on May 31, 1988. The committee strongly endorsed the Program, its current principal characteristics, and the Foundation's plan to carry out a doubling of the program over 1987-1991.

SENATOR MIKULSKI: Have any changes been made in the program as a result of the review?

ANSWER: The Committee made a number of significant recommendations, most of which the Foundation has approved and implemented. Among them were:

- o Expand the eligibility of the Minority Graduate Fellowship Program to second-year graduate students and, on a limited and experimental basis, to certain college juniors.
- o Extend eligibility for NSF's Facilitation Awards for Handicapped Scientists and Engineers to Fellowship Honorable Mention recipients (this eligibility had already previously been extended to Awardees).
- o Initiate a new component of Graduate Research Fellowships: Graduate Fellowships for Women in Engineering (Proposed in FY 1990 budget).
- o Initiate a procedure for annual review of stipend and allowances levels. (The 1988 review resulted in projected stipend increases for 1990 and 1991.)
- o Further encourage international experiences by reducing the length of a stay abroad for which a travel allowance will be provided from nine months to three months.

SENATOR MIKULSKI: The budget request states that "a minimum of 15 percent of the new Graduate Research Fellowship awards will be made to minority students primarily through the Minority Graduate Fellowship component." The FY 1990 request for the Graduate Fellowship program is $28 million; the request for the Minority Graduate Fellowship program is $3 million, which amounts to only 10 percent of the funds available for the Graduate Fellowships. (SEE-19) How does NSF ensure that minority students receive the indicated share of new fellowships awards?

ANSWER: The Minority Graduate Fellowship component existed at 10% of the total through 1988. The Foundation plans to increase this proportion to a new level between 15-20% over the next few years. Because these awards are for three years, but funding is year-by-year, total dollar allocations do not immediately reflect a new level of awards -- the two become consonant after the three-year phase-in of the new level. Further, the new management plan, explained elsewhere in the budget, adds an additional year to this delay in correspondence. Nevertheless, the key figure is the allocation of new awards. The Foundation verifies its commitment to the 15% level, and the dollar amounts will follow when these students are on tenure and in position to receive their stipends and allowances.

SENATOR MIKULSKI: Last year NSF pointed out that its precollege programs are the largest part of its efforts in science education. NSF acknowledged, however, that the states bear the principal responsibility for education under our system of government. (FY 1989 Senate Appropriation Hearings - p. 296) Yet a recent Stanford Research Institute Report concluded that NSF has not adequately responded to this realization. What has NSF done to work cooperatively with states to ensure NSF's precollege programs are incorporated into local schools curriculum?

ANSWER: Prior to the final release of the SRI report, SEE initiated discussions with several states and has supported several projects aimed at improving state knowledge of science and mathematics education, enhancing teaching, and improving student assessment activities.

The Directorate for Science and Engineering Education, for example, supports a project of the Council of Chief State School Officers, to collect comparable data on the condition of science and mathematics education among the states and has supported the CCSSO effort to develop NAEP items in science and mathematics for the state-by-state National Assessment comparison to be conducted in FY 1990.

In addition, SEE has supported a meeting of state directors of testing and state science supervisors to increase the coordination of state student assessment programs with new curriculum frameworks and projects such as the American Association for the Advancement of Science' (AAAS) "Project 2061" and the National Council of Teachers of Mathematics (NCTM) mathematics standards.

In addition to these activities, SEE staff have initiated ongoing discussions with a number of associations representing governors, state legislators, state boards of education, and chief state school officers. Presentations have been made at meetings of these organizations.

SEE supports a number of projects that are coordinated by states, initiated by states, enjoy matching state funding, and/or are developed at the state level for use on a national basis (particularly in the area of television and informal science). Teacher enhancement and private sector partnership programs are underway or being initiated in five states, instructional television programs are supported in several states, and informal science programs actively include state agencies in several state efforts (television, 4-H clubs, science centers, etc).

SENATOR MIKULSKI: How much contact has NSF had with the states?

ANSWER: In addition to the contacts mentioned in the answer to the previous question, NSF has received and processed numerous proposals from State agencies and there is an increasing stream of awards. Two examples are awards made to State Departments of Education (Georgia and Maryland), both involving the production of videotapes on science topics for use in the schools.

SENATOR MIKULSKI: What follow-up has it done to ensure these federal funds and the resulting NSF programs are actually being used?

ANSWER: For all educational projects that NSF supports, there is follow-up in three formats: 1) frequent phone conversations between project director and NSF program officer to discuss progress and problems; 2) written progress reports that are submitted by the project director to the Foundation at least annually and, in some cases, as often as quarterly; 3) site visits conducted by program officers and/or consultants to the Foundation.

Consider, for example, the two awards mentioned in the response to the question above. In the case of the award to Maryland follow-up revealed that planning [for a fifteen tape series that will use everyday events to integrate science and mathematics concepts] is complete, but that additional necessary funding [for production of the tapes] is yet to be identified. In the case of the award to Georgia, the goal was to alter the infrastructure of media use in the schools so that videotapes could be used in classrooms with a minimum of technological and bureaucratic barriers. Various follow-ups established that this goal was achieved.

SENATOR MIKULSKI: How much of the Science and Engineering Education Program's funding goes to state level organizations?

ANSWER: Under a broad interpretation of "state level organizations" -- i.e., including state-supported colleges and universities as well as organizations like state academies of science, state school superintendents (and groups of them), etc -- SEE made FY1988 grants of approximately $40.8 million to such organizations in support of precollege science and engineering education. Total precollege expenditures were $89.96 million; therefore, approximately 45% of the total went to state level organizations.

Under a narrow interpretation -- not including state institutions of higher learning -- the FY 1988 grants to state level institutions for support of precollege science and engineering education totalled approximately $2.0 million. This is equal to 2.2% of total precollege expenditures.

WOMEN IN ENGINEERING GRADUATE FELLOWSHIP PROGRAM

SENATOR MIKULSKI: The FY 1990 request continues for the fourth year in a row, an increase in the number of graduate fellowship awards. In addition to the fellowship program in the science education directorate, the engineering program will also provide 40 fellowships for women in engineering. Is this a new program and why don't you just combine it with the traditional graduate fellowship program in science education?

ANSWER: This is a new activity and consideration is being given to operating this as an expansion of the existing program in the manner suggested.

ENGINEERING PROGRAMS

SENATOR MIKULSKI: One of the reasons you use to justify the work of the agency's Engineering Directorate is that it helps U.S. industry stay technologically competitive through industrial innovation. (ENG,1) If that is the case, then why are you proposing that this program grow by less than that of the overall agency in FY 90? (ENG,1)

ANSWER: The FY 1990 Request proposes real growth in the Engineering Directorate, increasing $23.94 million or 12.8 percent over the FY 1989 Current Plan of $187.26 million and by almost one half since FY 1986. In FY 1987 and 1988, the Engineering Activity increased at a rate greater (3 1/2 and 2 1/2 percent, respectively) than that of the Research and Related Account (RRA), and, in FY 1989, at a rate equal to that of the RRA. Thus, the FY 1990 Request reflects a normalization after a period of "ramping up" for these important programs.

SENATOR MIKULSKI: The decline in the number of students who concentrate in engineering remains a major concern of mine. A great deal of the problem remains that U.S. students seem to lose interest in the field after they enter college. Despite this fact, however, less than 10% of your engineering directorate's work focuses on undergraduate education, and only $8 million in the entire agency budget does to develop new undergraduate engineering teaching materials and innovative approaches to engineering education. (ENG,4) How are we going to be able to make up any ground on the Japanese in the field when we direct so little money to this problem?

ANSWER: The National Science Foundation is moving very rapidly to increase the support for a program of support for engineering undergraduate curriculum development. In FY 1988 the support was $2 million. In FY 1989, the target is $4 million and the proposed FY 1990 budget calls for $8 million. This program doubled from last year to the current year and is planned to double again in FY 1990. This budget request represents a balanced approach to many problems in engineering research and education, while moving aggressively to build up support for improving engineering undergraduate education. It should be noted that other programs support the development of well educated engineers. Among these is the Research Experiences for Undergraduates program which has proved to be an important means by which U.S. engineering undergraduates are introduced to graduate education.

SENATOR MIKULSKI: One area you list as an emerging area in mechanical engineering is the field of Non-destructive Evaluation, the field whereby we can design and build structures to last longer. (ENG,11) How much, if any of your 8.3% increase proposed for mechanical engineering will go for this purpose.

ANSWER: Twenty-four percent, or $500,000, of the 8.3% increase proposed for mechanical engineering will be assigned to the field of Nondestructive Evaluation. In view of the rate of deterioration in older highways, bridges, aircraft pipelines, and other constructed systems, it is important to develop techniques and equipment to monitor the behavior of these structures to determine safety repair and/or retrofit methods. These innovative monitoring devices can be used to determine when a component or system is about to fail so that repairs may be made or the remaining safe service life of the facility may be determined.

SENATOR MIKULSKI: Part of the Electrical and Communication Systems Division's responsibilities is to manage the Japanese Technology Evaluation Project which helps the U.S. keep apprised of development in Japanese efforts in science and technology (ENG-15). How would the Foundation grade the Japanese and our other industrial competitors on the subject of scientific and technological innovation and why?

ANSWER: The JTECH program has evaluated a number of specific technology areas, and the comparison between the U.S. and Japan has varied somewhat depending on the technology. However, there has been a moderately consistent pattern that the U.S. seems superior in basic research and Japan in product development. The U.S. often was the first to introduce a radically new technology, but Japan was often first to perfect it, especially for consumer markets. The reason for this may be that the Japanese appear to foster group activities, which frequently promote the incremental improvements that create perfection in products, whereas the U.S. culture encourages individual efforts, which are most effective in invention and radical departures from the norm.

INTERNATIONAL COOPERATIVE SCIENTIFIC ACTIVITIES (ICSA)

SENATOR MIKULSKI: NSF is requesting $12.27 million for international cooperative scientific activities, an increase of $0.99 million or about 8 percent. (STIA-4) The program supports cooperative programs with countries such as Japan, the Soviet Union, China, and others. What is the U.S. share of the cost, as a percent, in each existing cooperative program, and what are the foreign government shares?

ANSWER: NSF manages some two dozen formal cooperative science and engineering programs in conjunction with counterpart agencies abroad and contributes about 50% to the total support for these activities. In most of these programs each country is responsible for the support of all expenses associated with the participation of its scientists and engineers in the cooperative activities. Because countries have different systems for funding research and each activity has singular circumstances, a precise matching on a project-by-project basis is neither necessary nor feasible, and NSF has never sought nor required quantification of the foreign contribution. In a substantial number of these projects the foreign contribution in terms of personnel, equipment, etc. far exceeds our own. In others the reverse may be the case. The number of scientists who have gone abroad are about the same as the number of scientists who have come to the U.S. under these programs. However, on an aggregate basis there clearly is a rough balance in the U.S. and foreign contribution to the cooperative activities supported under these programs.

SENATOR MIKULSKI: The ICSA program also promotes U.S. research participation in Japanese laboratories. (STIA-2) How do you ensure that your program is of at least as much benefit to the U.S. as it is to Japan? Specifically, what controls are in effect which enable you to do that?

ANSWER: All proposals for cooperative research with Japan require approval by both NSF and the appropriate counterpart Japanese Government agency. Each proposal is evaluated independently by NSF, usually through the merit review system. Applicants are asked to detail the expected benefits of the project to the applicant and to the U.S. science community. In addition to their scientific evaluation, reviewers are asked to comment explicitly on the perceived benefit from the international cooperation.

SENATOR MIKULSKI: What agreements have been adopted concerning the use to be made of the research results by each country?

ANSWER: The NSF-Agency for Industrial Science and Technology (AIST) Program, which makes available 30 positions a year for U.S. researchers at AIST laboratories, is governed by the Agreement Between the Government of the United States of America and the Government of Japan on Cooperation in Research and Development in Science and Technology. In addition, the Memorandum of Understanding for the NSF-AIST Program states that, "With respect to any invention made during the stay of the researchers designated by NSF in the host AIST institutes, AIST shall acquire all rights and interests in the invention in Japan and in third countries, and the designated researcher and/or his or her home institution shall acquire all rights and interests in the invention in the United States of America, unless otherwise agreed by the parties." Activity under the U.S.-Japan Program of Cooperation in Photoconversion and Photosynthesis is governed by similar language. Where no specific provisions exist for the use of research results (such as for the U.S.-Japan Cooperative Science Program), disposition is on a case-by-case basis. We give up nothing going in and get no guarantees. NSF is currently discussing with our Japanese counterpart the addition of specific provisions on intellectual property rights into the implementing guidelines for the U.S.-Japan Cooperative Science Program.

SENATOR MIKULSKI: What is the cost of the program to the U.S. and to the Japanese?

ANSWER: Foundation programs involving Japan support U.S. scientists and engineers through: (1) funding of direct research (salaries and equipment) and travel-related activities under the U.S.-Japan

Cooperative Science Program; (2) development of technical Japanese language curricula and language study; and, (3) fellowship and postdoctoral awards for research stays to university, corporate, and national laboratories in Japan.

In FY 1989, excluding direct research support, NSF expects to provide $1.6 million in support of Japan-related activities; comparable Japanese government support during this period is expected to amount to $5.0 million. Over this period, the funding for direct research support for collaborative projects between NSF and the Japanese government will depend on the number and quality of proposals received.

COST-SHARING WITH OTHER FEDERAL AGENCIES

SENATOR MIKULSKI: Since FY 1985, the level of interagency transfers of resources to NSF from other federal agencies has increased by over 50%. What accounts for this increase? Are you getting more cost sharing for basic research from other federal agencies?

ANSWER: Federal agencies have entered into reimbursable agreements with the National Science Foundation in order to provide joint support for activities of mutual interest. In FY 1987 and 1988 the Foundation entered into nearly five hundred ageements with other Federal agencies for activities that included research at NSF facilities such as the National Radio Astronomy Observatory (NRAO), the National Center for Atmospheric Research (NCAR), and ocean research ships. Joint funding also provides support for scientific conferences, the efforts of special Committees and a wide variety of smaller research projects.

Because NSF has the ongoing administrative systems necessary to award and manage grants it logically assumes the lead role when external events demand quick start-ups of topical studies involving several agencies. For example, studies of the effect of windshear and related topics were accelerated in response to the crash of a passenger jet in Dallas. The Department of Transportation and National Oceanographic and Atmospheric Administration joined with NSF in providing, through reimbursable agreements, substantial support to related scientific research projects.

INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS

SENATOR MIKULSKI: Last year the appropriations act earmarked $900,000 only for support of the International Institute for Applied Systems Analysis. What is the status of that award?

ANSWER: On March 31, 1989, NSF received IIASA's proposal for the funds earmarked in the Foundation's FY 1989 appropriation. The State Department is now concluding the interagency review of the proposal IIASA submitted to NSF in July 1988 for FY 1988 funds. When a decision has been reached on that proposal, NSF will begin external peer review of IIASA's proposal for FY 1989 funds.

GLOBAL CLIMATE CHANGE

SENATOR MIKULSKI: NSF is requesting $8.6 million for Global Geosciences programs for 1990, to include climate change studies, under the category of disciplinary research and facilities (GEO-3). How much of that amount will be used for studies of global climate change?

ANSWER: NSF is requesting a total of $74.4 million for Global Geosciences programs in FY 1990, including an increment of $8.6 million for Global Geosciences programs within the Geosciences Activity under the category of Disciplinary Research and Facilities. Of this increment, $3.81 million will be used for global climate change research. This includes support for the World Ocean Circulation Experiment, the Tropical Ocean Global Atmosphere program, and Arctic Systems Science. In addition, $3.59 million of the increment will be used for atmospheric chemistry and ocean flux studies, some of which are related to global climate change.

SENATOR MIKULSKI: NSF is also requesting $3.9 million, which represents an increase of nearly 50 percent, for Global Geosciences activities, to include climate studies, under the category of centers and groups (GEO-4). How much of that amount will be used for studies of climate? How will these studies differ from those in the category of disciplinary research and facilities?

ANSWER: NSF is requesting a total of $74.4 million for Global Geosciences programs in FY 1990, including an increment of $3.9 million for Global Geosciences programs within the Geosciences Activity under the category of Centers and Groups. Of the requested increment, $1.31 million will be used for climate studies. These funds will be used primarily for focussed group activities associated with the World

Ocean Circulation Experiment (WOCE), such as the WOCE Hydrographic Program, and a smaller amount for the Tropical Ocean Global Atmosphere (TOGA) program. Another $1.06 million of the increment will be used for atmospheric chemistry and ocean flux studies, some of which are related to global climate change.

Global climate change studies under Disciplinary Research and Facilities include $2.5 million for Arctic Systems Science, with particular emphasis on the Greenland Ice Sheet Project, and support for WOCE and TOGA. Projects under the category of Disciplinary Research and Facilities are conducted by individual investigators and are complimentary to the group activities.

GEOSCIENCES: GLOBAL WARMING

SENATOR MIKULSKI: Does NSF coordinate its activities related to global climate research with other federal agencies' efforts as well as with international efforts? Please provide the committee information on other efforts in the area as well as description of how your efforts differ from, complement, or duplicate other efforts.

ANSWER: NSF actively coordinates its activities related to global climate research with other federal agencies through several mechanisms, the primary one being the Committee on Earth Sciences (CES), a Committee of the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET). The CES is the principal interagency vehicle for the planning and coordination of the U.S. Global Change Research Program. This program is described in a special document submitted to the Congress as a part of the President's FY 1990 budget entitled Our Changing Planet.

The CES's plans are linked closely to the plans of the International Geosphere-Biosphere Program (IGBP) that has been developed under the auspices of the International Council of Scientific Unions (ICSU). The CES has introduced some ideas about international science coordination into the ICSU arena for other nations' consideration, but implementation and international coordination forums have not yet been established.

The National Climate Program Act (PL 95-367) established a National Climate Program Office (NCPO) and a Climate Program Policy Board. The NCPO has led much of this nation's early interest and program development in research and science policy related to climate.

An example of this coordination was the creation of the interagency working group for the Tropical

Ocean-Global Atmosphere program (TOGA), an international research program on interannual variability of the coupled atmosphere-ocean system, aimed at understanding and predicting global climatic events, such as El Nino/Southern Oscillation. This working group comprises representatives of NOAA, NASA, NSF and DOD and regularly meets at the U.S. TOGA office housed in NOAA to coordinate the individual agency efforts in pursuit of the TOGA objectives and to discuss issues of interest to the U.S. TOGA project office.

The international dimension of global climate change advanced significantly with the establishment last year of an Intergovernmental Panel on Climate Change (IPCC) under auspices of the World Meteorological Organization (WMO) and the United Nations Environment Program. The CES and the Climate Program Policy Board developed U.S. positions for the first meeting of the IPCC, recommending separate panels for consideration of science issues, likely impacts, and national response strategies.

NSF works with the World Meteorological Organization's World Climate Research Program office, where the International TOGA office is located. Moreover, NSF's program directors participate as delegates to international commissions such as the WMO's Commission on Climatology to ensure that the agency's efforts complement national and international efforts.

In summary, NSF works in many ways with other agencies both nationally and internationally so that resources are effectively and efficiently used.

GEOSCIENCES: OCEAN ENGINEERING

SENATOR MIKULSKI: Last year, the committee directed that $3 million be used to support a program of ocean engineering with a specific focus on the issues important for the pacific basin. Where does that program stand?

ANSWER: The NSF has traditionally funded Ocean Engineering and Ocean Technology through a number of programs, primarily in the Geoscience and Engineering Directorates. A recent estimate of these activities indicates that over $12 million will be devoted to Ocean Engineering and Technology in FY 1989.

A joint announcement publicizing the Engineering Directorate's new Ocean Engineering Program and Geoscience's existing programs that traditionally fund ocean engineering and technology has been distributed to the academic community. In response to the committee's directive, the announcement emphasizes the new Pacific Basin focus.

In the Engineering Directorate, proposals to the new Ocean Engineering Program, totaling approximately $2.1 million, are in various stages of review, with $250,000 presently funded. About $1.45 million of the $2.1 million proposed focuses on the Pacific Basin. The current plan for the Ocean Engineering Program is $1.4 million.

In the Geosciences Directorate, proposals requesting approximately $10 million for Ocean Technology research are under review. About $5 million of the $10 million proposed focuses on the Pacific Basin, with $1.2 million presently funded. A minimum of $2.0 million has been targeted specifically for Pacific Basin Ocean Technology in the Geosciences Directorate.

GEOSCIENCES: GLOBAL RESEARCH INITIATIVE

SENATOR MIKULSKI: The Administration has a major initiative in the global research program. NSF is a major player in this interagency effort. How is this initiative being coordinated among the various agencies so that roles and responsibilities are clearly delineated and we don't have agencies duplicating programs and activities. In that respect, is the current academic fleet adequate to support the program?

ANSWER: The Committee on Earth Sciences (CES), a Committee of the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET), is the principal interagency vehicle for the planning and coordination of the U.S. Global Change Program. A report by the CES, Our Changing Planet: A U.S. Strategy for Global Change Research, accompanied the President's FY 1990 Budget Request to Congress. It outlines a coordinated program across many of the federal agencies. The member agencies of CES have demonstrated their commitment to a coordinated, interagency effort to design and implement a U.S. Global Change Research Program. The CES has developed and approved agency research role statements for all the participating agencies and bodies. These agency roles have been clarified so that complimentarity and effective meshing of agency roles underpin the program.

The goals of the Global Change Research Program will require cooperation on the international level. This will include provision of research vessels by other nations in addition to the academic fleet. For example, the North Atlantic Bloom Experiment, a component of Global Change Research, is being conducted with research vessels from five nations (U.S., Canada, Federal Republic of Germany, Netherlands, and the United Kingdom). Some of the older research vessels will need to be replaced with ships having improved performance capabilities and instrumentation during the coming decade.

SENATOR MIKULSKI: Recently, the EPA issued a policy paper listing specific steps that should be implemented to reduce the trend towards global warming. At the same time, NSF and NASA have told me that we don't have all the information we need to make policy decisions on this issue. Is there a lack of coordination over policy in this matter in which the President's new Science Advisor must become involved?

ANSWER: At the present time, there is a need for a forum within the Executive Branch where policy issues can be discussed among the various agencies. As outlined in the President's "Building a Better America", the President will issue an Executive Order defining the responsibility of Federal agencies on global climate change issues. This Executive Order is currently being developed in the Executive Office. Issues of lesser importance are discussed by the Climate Program Policy Board, a Board established under the National Climate Program Act (PL 95-367).

The EPA report, "Policy Options for Stabilizing Global Climate", is only a draft that is currently under review. This draft report identifies and discusses a series of options, not recommendations, that might be considered by policy makers to reduce the rate at which greenhouse gases are accumulating in the atmosphere. Detailed feasibility and cost/benefit analyses for implementing these options still must be carried out.

The report indicates that even if all considered options for reducing emissions of greenhouse gases were implemented, the atmospheric concentration of these gases would continue to increase. The scientific community is not sure how this will effect the climate system. More investigation of the entire climate system is needed to understand how it works and how it reacts to both man-made changes or changes of natural origin.

There still are very large uncertainties associated with climatic impacts expected from increased atmospheric concentrations of carbon dioxide and other radiatively active gases. These uncertainties include the amount and timing of global warming and associated changes induced in the regional distribution of precipitation and extreme weather conditions.

We do not yet know how much money foreign participants will contribute to this office. The U.S. WOCE scientific committee has offered to support and operate the WHP Office. However, the Federal Republic of Germany (FRG) has offered to fund entirely a WHP data analysis center at Hamburg, as a part of the German hydrographic center. We are not entirely clear regarding the scope of that operation--just as they are not quite clear regarding the scope of our WHP Office contribution, since neither have been funded and established at this time. In general, however, that data center will accept the initial quality controlled data from the WHP Office and will produce a series of anaylsis products therefrom.

SENATOR MIKULSKI: What other federal agencies participate in this experiment and what is unique about NSF's role, as compared to these other federal agencies?

ANSWER: The NSF is the lead federal agency for the World Ocean Circulation Experiment (WOCE) and as such plays a unique role in leadership for the U.S. academic research community and the U.S. federal agencies, as well as providing the largest component of the funding. The NSF will support the contributions of the U.S. academic scientists, the WOCE Hydrographic Office, ship and facility support for U.S. components of the WOCE Hydrographic Program and supercomputer modeling activities at the National Center for Atmospheric Research. NOAA, NASA and ONR are the other principal agencies that complement the NSF effort by (1) contributing in their own areas of specific expertise and mission appropriateness, and (2) providing financial support for the U.S. WOCE Planning Office. NOAA will operate some of the WHP track lines, NASA will continue to provide for the implementation of necessary satellite sensors, and ONR will support specific experiments which complement the WOCE Implementation Plan.

SENATOR MIKULSKI: How much is the entire federal contribution to this particular experiment, by agency, and how much is NSF planning to spend on this project in FY 1990?

ANSWER: The entire federal contribution to the World Ocean Ciruculation Experiment (WOCE) over 1990-97 is estimated at $224.2 million, and is expected to be distributed between the agencies in the following manner: 68 percent NSF; 14 percent NASA; 12 percent NOAA; and 6 percent ONR. However, these estimated costs are necessarily very uncertain and difficult to predict.

In FY 1990 NSF plans to spend $8.1 million in Global Geosciences funds and approximately $5.4 million in areas of physical oceanography, both of which will contribute to the overall objectives of the WOCE program.

GEOSCIENCES: ARCTIC RESEARCH

SENATOR MIKULSKI: You propose an increase of over 25 percent for Arctic research projects in the Geosciences directorate. (GEO-22) What is the pressing need for research in the Arctic that warrants an increase of this size?

ANSWER: This increase in arctic research relates directly to understanding of change in global climate. The $2.5 million increase will be used for the Arctic Systems Science (ARCSS) program. Paleoclimate studies from ice sheets are a key part of this effort. Preparations for a Greenland ice-coring project are under way. The project is expected to provide a detailed 125,000-year climate record unobtainable by other means. Paleoclimate studies and investigations of modern environmental processes can contribute significantly to global climate forecasts. Logistical preparation, camp construction and scientific preparations require most of the increase. Detailed planning will take place in FY 1990 for other components of ARCSS, including coordinated research on land ecosystems and atmospheric interactions and high-latitude oceanic and atmospheric processes.

SENATOR MIKULSKI: Will there be any work done in connection with recent oil spill in Alaska involving the tanker Valdez?

ANSWER: NSF was the first federal agency to provide support for scientific research on the spill. A research project by the University of Alaska's Institute of Marine Science has already been funded. This project will study the oceanography of the oil spill and will provide baseline information for future studies. The NSF-funded research vessel Alpha Helix, operated by the University of Alaska, will be used for this research, and may also be used for some of the industry-funded oil spill research.

NSF is also supporting studies of the spill of refinded petroleum products resulting fro the sinking of the Argentine ship Bahia Paraiso at the U.S. Palmer Station in Antarctica, and comparative research may well be appropriate.

SENATOR MIKULSKI: What other NSF directorates contribute to Arctic research and how much funding do they provide?

ANSWER: NSF directorates other than Geosciences support arctic research in FY 1988 as follows (millions of dollars):

Biological, Behavioral & Social Science	$1.98
Science & Engineering Education	.21
Engineering	.34
Science, Technology & International Affairs	.35
Mathematical & Physical Sciences	.02
	$2.90

These funds, together with $20.2 million from the Geoscience Directorate, comprised NSF FY 1988 funding for arctic research of $23.1 million.

MATHEMATICAL AND PHYSICAL SCIENCES: ASTRONOMICAL SCIENCES

SENATOR MIKULSKI: NSF is requesting $94.02 million for astronomical sciences in 1990, an increase of $4.5 million or 5 percent above its current budget. (MPS-4) In last year's hearing, it was stated that NSF planned to spend $1.7 million in 1988, and about $2.0 million in 1989, for new telescope technology. (FY 1989 Senate appropriate hearings, p. 351.) Can you tell us how much you spent in 1988, and how much you plan to spend in 1989 and 1990?

ANSWER: In 1988, $1.9M was spent for new telescope technology. Plans call for $1.9M in 1989 and $2.3M in 1990.

SENATOR MIKULSKI: Last year, NSF indicated that the total cost of developing a new advanced technology 8-meter telescope was estimated at between $30 million and $50 million. What is the latest cost estimate for this project?

ANSWER: Although a specific proposal has not yet been received, the latest cost estimate for developing and constructing a new advanced 8-meter telescope is $65M.

HIGH MAGNETIC FIELD LABORATORY

SENATOR MIKULSKI: The FY90 budget proposes to begin the construction of a $100 million national high magnetic field laboratory. What priority do you attach to this facility which will require $12 million next year?

ANSWER: The construction of a national high magnetic field laboratory has high priority in the Foundation's plans for support of research. It was strongly recommended by a panel of national experts, to keep the United States at the forefront in this area. High magnetic field research encompasses broad range of disciplines from biology to the science of new materials. It is of particular importance to continued progress in the development of high temperature superconductors, and other areas with significant economic consequences.

SENATOR MIKULSKI: Is it a higher priority than the second round of Science and Technology Centers?

ANSWER: This question addresses two different activities that focus on two separate strategic categories of support. The proposed national high magnetic field laboratory has high priority within the Foundation's strategic plan to strengthen the disciplinary research base and improve academic science and engineering facilities. This national facility will provide unique opportunities for investigators, in a wide range of disciplines, to pursue their individual research plans.

The Science and Technology Centers have high priority within the Foundation's strategic plan to expand group and centers research activity. Centers respond to the increasing size and complexity of many of today's research problems, and facilitate cooperation across the academic and private sector.

These activities cannot simply be ranked to determine whether one would be cut back more than the other in the event that the full budget request is not approved. Rather, balance between these two strategic categories of support -- (1) disciplinary research and facilities and (2) centers and groups -- must be maintained. Such balance is addressed by the Foundation in the context of overall funding levels requested in the FY 1990 Budget Request.

RESEARCH FACILITIES

SENATOR MIKULSKI: A recent NSF scientific and engineering research facilities survey discovered that nearly 60% of space currently used for academic research is in need of repair. However, there is little consensus on how serious the problem is and the proper Federal role in helping to resolve this predicament. Last year, Congress enacted the Academic Research Facillities Moderization Act as part of the five year NSF Authorization Act, but the budget requests no funds for this activity. What is NSF's position on funding this initiative in FY 90, which is authorized at $125 million this year?

ANSWER: The most recent NSF survey of Science and Engineering Research Facilities at Universities and Colleges: 1988, NSF 88-320, indicates 39% of the research space needs some repair/renovation. Approximately 16% requires major repair/renovation and 23% of the space requires limited repair/renovation. NSF has not requested funding for the Academic Research Facilities Modernization Program initiative in its FY 90 budget. NSF's position is that funding for facilities should not come at the expense of the planned doubling of NSF's base programs or the current FY 1990 request. The Foundation's priorities have been and remain people first, then instrumentation, lastly facilities. In this light, the Foundation supports inclusion in the FY 1990 appropriations act the provision included in the FY 1989 appropriations act that prohibited the use of funds to implement the new academic research facilities program.

SENATOR MIKULSKI: Last week, the American Council on Education sent me a letter requesting funds for the facilities initiative above the Administration's request for FY 90 for NSF. To fully fund the initiative would mean NSF would get a 21% increase over last year, unless we funded this initiative out of NSF's base programs. Given the current budget climate, do you think this is a fiscally realistic approach in Fiscal 1990?

ANSWER: NSF's position is that funding for facilities should not come at the expense of the planned doubling of NSF's base programs or the current FY 1990 request. The Foundation's priorities have been and remain people first, then instrumentation, lastly facilities. In this light, the Foundation supports inclusion in the FY 1990 appropriations act the provision included in the FY 1989 appropriations act that prohibited the use of funds to implement the new academic research facilities program.

SENATOR MIKULSKI: How strongly would NSF and the Office of Management and Budget oppose facilities funding which came out of NSF's base programs?

ANSWER: The Administration would strongly oppose the funding of the Academic Research Facilities Modernization Program initiative at the expense of NSF base programs. Because this is inconsistent with our stated priorities, the Foundation supports inclusion in FY 1990 appropriation act the provision included in the FY 1989 appropriations act prohibiting the use of funds to implement the new academic research facilities programs.

SENATOR MIKULSKI: The NSF Authorization Act requires a report on this program by June 15, 1989. How is this report progressing? Do you anticipate it to contain any real suprises?

ANSWER: Six regional meetings with approximately 500 attendees have been held as part of the information gathering and input activity for the report. Draft program guidelines are expected to be published in the Federal Register in mid-April. The report is in preparation and it is expected that it will be delivered close to the June 15 date. We do not anticipate major suprises.

SENATOR MIKULSKI: Given the number of recent new initiatives (e.g., engineering research centers, S&T centers, the growth of the SEE and Antarctic directorates) how can NSF afford to begin a $80-$125 million research facilities program? Has your staff examined what areas of the Foundation's budget would have to be cut in order to pay for the facilities program? Would the Foundation have to consider reducing the number of grants awarded to individual investigators?

ANSWER: NSF does not believe it can afford a major facilities program within either its current FY 90 budget request or the planned doubling of NSF's base programs. NSF has not considered what areas might have to be cut in order to pay for a major new facilities program. Funding a major facilities program out of the current budget request would presumably affect the number or size of grants awarded to individual investigators.

SENATOR MIKULSKI: NSF recently announced the establishment of the Research Facilities Office (RFO). How many people does NSF expect to work in this new office? Will the office be staffed by existing NSF personnel or will NSF have to hire new people?

ANSWER: The size of the Research Facilities Office will ultimately depend on the future of the program, how the program is managed within NSF, and other responsibilities of the office. There are currently, a total of 5 staff members who have been assigned to the office from elsewhere in the Foundation.

FUNDING FOR SOCIOLOGY AND SOCIAL SCIENCES

SENATOR MIKULSKI: The budget request proposes a 12% increase in sociology and a 10.5% increase in the law and social science program. Much of the NSF budget is justified on the basis of improving our economic competitiveness. How will sociology and the law improve our ability to compete with the Japanese?

ANSWER: The social and behavioral sciences are experiencing a major reorientation, shifting from research on the individual to research integrating the study of social, political, economic and legal institutions and organizations. This research has a basic theoretical impetus and direction, but national concerns with economic competitiveness are providing an important stimulus.

Many of the studies focus on specific intermediate issues such as efficiency, power, control or authority. Each, in varying degree, has the potential for illuminating significant dimensions of the "competitiveness problem". For example, in sociology, research interests include a focus on the determinants of corporate expansion and reorganization, the capacities of organizations for technological development, and the networks of relations among organizations.

Some of the most innovative work, supported by the Law and Social Science Program, centers on organizations: their legalization, social control and conflict resolution within and between them, and the impact of legal rules ("anti-trust" statutes, for example) and contractual relations on corporate behavior. These projects seek to advance our general understanding of competitive behavior and aggregative outcomes, as well as our knowledge of the performance of different socio-economic systems such as those of our trading rivals including Japan.

BIOTIC SYSTEMS AND RESOURCES

SENATOR MIKULSKI: The Biotic Systems and Resources subactivity is proposed to increase by almost 21%. What accounts for this large increase?

ANSWER: The increase in Biotic Systems and Resources is requested to support research on various aspects global change. Biodiversity, or the effects of environmental change on life forms, represents well over half of the increase requested. The development and integration of the databases on biodiversity is the beginning of an activity of fundamental significance. Research on the contributions of ecological systems to environmental change, including the biogeochemistry of "greenhouse gases," for example, is part of the request. The Long-Term Ecological Research sites - 17 nationwide - are the physical base for these global environmental studies. Support for their coordination and networking is included.

BIOLOGICAL COMPUTING

SENATOR MIKULSKI: The FY 90 budget proposes $2.5 million for a national center for biological computing. Will this result in a new supercomputer center being established?

ANSWER: No. For the past two decades, advances in disciplines across the biological sciences have resulted from the application of ever more powerful computers. Currently, access to supercomputers under conditions that encourage optimum usage will permit biologists to exploit fully the contemporary computer revolution and address important, complex biological problems, such as ecosystem dynamics and the modeling of large, interacting macromolecular assemblies. To address these needs at the lowest cost, the National Center for Biological Computing will augment an existing supercomputer university resource or center, building upon the far greater expenditure made to establish the original resource and to maintain it. Specific instrumentation (computer hardware) and personnel will be provided in the funding. What is the status of the existing national supercomputer centers?

ANSWER: The Directorate for Computer and Information Science and Engineering has requested an increase to renew the cooperative agreements at the five Centers and begin upgrading their hardware and software. Important discoveries and new insight across the basic sciences have come from their use. Support for specific scientific applications at the Centers is not provided by the Directorate for Computer and Information Science and Engineering. Does this biological computing initiative involve the computing directorate and if so, in what way?

ANSWER: The Directorate for Biological, Behavioral and Social Sciences will work with the Directorate for Computer and Information Science and Engineering, seeking their expertise and technical advice, in order that the computational tools have maximum impact on progress in the biological sciences.

BIOLOGIC DIVERSITY INITIATIVE

SENATOR MIKULSKI: You are proposing $11 million for a new initiative in biologic diversity to address growing scientific concerns on the loss of biotic diversity. What is the practical significance of this loss and why is understanding it so important?

ANSWER: Biological diversity refers to the variety of life forms and the ecological roles they perform. The one value of biological diversity to mankind in the past has been dependence on animal, plant, and microbial species for food, fuel, fiber, drugs, and raw materials for a host of manufacturing technologies. The loss of biotic diversity means the elimination of future benefits to the human race. The new approaches of genetic engineering and biotechnology, especially in the pharmaceutical and food-processing industries, utilize natural genetic diversity from sources worldwide. The loss of this diversity would greatly curtail the development of those industries. Thus material, ethical and esthetic concerns argue for rational stewardship of the world's heritage of biological resources, an all-out effort to stem the rate of loss of diverse species of plants and animals.

The management of these biological resources for sustainable development and for conservation, upon which this generation and the following depend, requires basic knowledge about what the resources are, where they occur, and how they interact. Yet we are in danger of degrading or losing these resources; tragically in tropical and marine habitats, we are losing resources even before they are surveyed and named.

SENATOR MIKULSKI: In the event that NSF is not able to receive its 14% increase, would you still recommend that we fund this initiative, even if it meant reducing other funds for other programs in biological sciences.

ANSWER: Our commitment to increasing support for the scientific investigation of biodiversity is evident from examining the budget request. The biodiversity initiative represents 43% of the additional funds requested in BBS for "Disciplinary Research and Facilities." In a discipline in which scientific opportunities abound, this decision represents serious priority setting on our part. NSF/BBS already provides over 90% of the research support for college and university scientists and their students devoted to the scientific basis of biodiversity. Our contribution is approximately 40% of the total research expenditure of all countries and U.S. leadership is widely acknowledged and expected. We feel that the problem of loss of biological diversity is so serious to the U.S. as well as the rest of the World that this initiative must go forward. It requires additional funds.

NATIONAL CENTER FOR BIOLOGICAL COMPUTING

SENATOR MIKULSKI: You are proposing to establish a National Center for Biological Computing from the $3.4 million increase you propose for Instrumental and Resources in the BBS directorate. (BBS-25). Why is this particular kind of facility needed?

ANSWER: For the past two decades, advances in disciplines across the biological sciences have resulted from the application of ever more powerful computers. Currently, access to supercomputers under conditions that encourage optimum usage will permit biologists to exploit more fully the contemporary computer revolution and address important, complex biological problems, such as ecosystem dynamics and the modeling of large, interacting macromolecular assemblies. Facilities and support are required for specific needs of biologists, including the capacity for visualization, a good, user-friendly interface for access, help in development of specialized software, and technical training for biological users to make optimum use of computer tools. A resource for the sharing of specialized software and databases is also needed. To address these needs at the lowest cost, the National Center for Biological Computing will augment an existing supercomputer university resource or center, building upon the far greater expenditure made to establish the original resource and to maintain it. Specific instrumentation (computer hardware) and personnel will be provided in the funding.

What will it's total cost be?

ANSWER: The total cost will be up to $2.5 Million in FY 90 to establish the facility; up to $0.5 Million will be required per year to maintain the facility.

SENATOR MIKULSKI: Where do you expect this center to be located?

ANSWER: The Center will augment an existing supercomputer facility, resource or center, leveraging the considerably larger investment in hardware and maintenance costs, as well as in technical expertise, in order to provide an outstanding resource at the least cost. The specific location will be determined by merit review of applications submitted in response to a request for proposals.

How will you determine who has access to this database?

ANSWER: Access to the facility will be provided following standard NSF merit review. The databases are currently available to the academic community.

SENATOR MIKULSKI: Will any of the center's cost be reimbursed through user fees assessed on these with access to the data?

ANSWER: The NSF award will only meet part of the costs of maintaining the National Center for Computational Biology, just as the NSF funds meet only part of the costs of maintaining the NSF National Centers. Investigators will have to obtain other sources of support to access the facility electronically or by traveling to the site.

BIOLOGICAL, BEHAVIORAL AND SOCIAL SCIENCES: UNDERGRADUATE PROGRAMS

SENATOR MIKULSKI: BBS is requesting, for undergraduate activities, an increase of $6 million to respond to known needs in on-going activities and to stimulate greater involvement of minorities and women. How much of the increase will be used to achieve the latter goal, and on what, specifically, will the funds be spent?

ANSWER: The increase will be used to enhance support for the following undergraduate activities within BBS: $2.0 million to increase support for the Research Experiences for Undergraduates (REU) program; $2.0 million to increase support for the Instrumentation and Laboratory Improvement (ILI) program; $1.5 million to increase support for faculty enhancement activities at undergraduate institutions; and $0.5 million to increase BBS participation in other cross-directorate undergraduate activities such as career access and special activities at minority institutions.

Evaluation of REU proposals in BBS emphasizes the participation of women and minority undergraduates in the research proposed. Both ILI and faculty enhancement programs are focussed on four-year institutions. Again the impact of the proposed activity on women and minorities at those institutions is a significant criteria in the final evaluation of the proposal.

SOCIOLOGY: OVERCROWDING IN BANGKOK

NSF is requesting $8 million (an increase of 3.5 percent) for research related to anthropology. (BBS-18) Last year, the subcommittee questioned the $150,000, three-year grant for the study of crowding in Bangkok, Thailand. (Senate Hearings - p. 364) NSF said, among other things, that most of the past research has been carried out in the more developed parts of the world, and that, therefore, the extreme levels of crowding found in parts of Bangkok provide a valuable laboratory for such research.

SENATOR MIKULSKI: How will the knowledge gained from a study of crowding in Bangkok be usable in the United States, given that we are less crowded than the subject of the study and that religious, cultural, and ethnic differences between Thais and Americans may well cause the citizens of each country to respond entirely differently to crowding?

ANSWER: This study of crowding in Bangkok, Thailand is funded by the Sociology Program of the Division of Social and Economic Science, not the Anthropology Program, as reported in the referenced 1988 Senate Hearings (page 364).

The study investigates whether the extreme levels of population density found in parts of that city are associated with greater stress-related physical illness and social tension. The underlying rationale for the work is comparative. The research team is now mounting an investigation to explore the extent to which the Bangkok experience generalizes to urban communities in the United States which have sufficiently dense concentrations of households to enable meaningful comparisons. Selected clusters in Chicago initially have been selected for that purpose.

The question of the possible effects of different ethnic and cultural patterns on the observed response to urban crowding have been assessed by the Bangkok research team with the following results: First, the Bangkok area itself is not homogeneous, as commonly supposed. Second, its diverse ethnic and cultural composition appears to make no difference in the urban crowding/stress relationship revealed by the study. The researchers hypothesize that ethnic differences found in U.S. cities, likewise, will not affect the urban crowding/stress relationship and that inter-country comparisons will not be invalidated due to the ethnicity factor.

SENATOR MIKULSKI: If the results of the Bangkok crowding study will not be usable in understanding and/or ameliorating U.S. overcrowding situations, why should U.S. taxpayers fund such a study, especially at a time when the nation is experiencing record budget deficits and questions are being asked on the affordability of many federal programs?

ANSWER: The results of the Bangkok crowding study are expected to yield useful comparative insights not only about overcrowding situations in the U.S., but also regarding related experiences of Third World and other countries. Reliance on U.S. taxpayers to support such a study is justified both for its scientific interest and for its potential relevance for decisions in the public sector.

EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE RESEARCH

SENATOR MIKULSKI: The Committee has had a long standing interest in the Experimental Program to Stimulate Competitive Research (EPSCoR). This program is designed to help selected states develop their academic research capabilities and thereby compete more successfully for federal R&D support. The FY 90 budget proposes a 20% increase in that program. What will those additional funds be used for and what are your long term plans for this program?

ANSWER: At the present time 17 States have been designated as EPSCoR States. These States are identified in the budget document. Our long-range plan will:

(i) Continue support of all eight 1986 EPSCoR States which are currently midway through their five-year EPSCoR awards. (Alabama, Kentucky, Nevada, North Dakota, Oklahoma, Puerto Rico, Vermont,and Wyoming)

(ii) Support, where justified, awards for the four 1986 non-awardee States who implemented all or part of their 1986 EPSCoR proposals with their own resources and submitted new requests in the fall of 1988. These awards will be for up to three years of support at approximately $600,000 per year. To date, an award has been made to Louisiana and proposals from Mississippi, Idaho and South Dakota are under consideration.

(iii) Support five planning grant requests ($20,000 each) in the original FY 1980 EPSCoR States (Arkansas, Maine, Montana, South Carolina, and West Virginia). The term of these awards will be approximately five months in duration at which time, new EPSCoR implementation proposals will be submitted by the five States for an initial two-year development award. The 20% increase in FY 1990 will permit reinstituting the EPSCoR program in these five States.

(iv) In the Summer of 1991, all 17 States will be invited to compete again for continuation of their EPSCoR initiative. Proposals will be judged in competition with one another based on past performance of each State and its potential for further development under the program. Multi-year EPSCoR advanced development awards under this competition would be made in FY 1992.

EARTHQUAKE RESEARCH: HAZARDS REDUCTION PROGRAM

SENATOR MIKULSKI: Your budget proposes a 9% increase in biological and critical systems engineering research, to a level of nearly $40 million (ENG, 23). Slightly less than half this amount is to be used for Earthquake Hazard Mitigation Research. Could you characterize the state of that research?

ANSWER: The earthquake engineering research at NSF is divided into the four distinct areas of siting and geotechnical systems, structural systems, architectural and mechanical systems, and earthquake systems integration. Since the early 1960s the earthquake engineering research program at NSF has been the principal instrument in the U. S. for conducting earthquake engineering research for use in mitigation of earthquake hazards worldwide. Significant advances have been made in many areas in the past and these include specification of strong ground motion, evaluation of ground failures, new analysis and design methodologies for structures, implementation of base isolation systems in the U.S., dissemination of research results and information using NSF supported centers, and support of equipment and instrumentation for research facilities. We expect to continue to support these and related earthquake engineering research projects in the future. Additionally, the significance of the potential for loss of life and property in the central and eastern United States due to earthquakes will require more research directed toward these areas. Some research areas are the evaluation of strong ground motion, effects on systems without seismic design, strengthening, retrofit, and upgrade of existing structures and lifelines. NSF has addressed the important earthquake engineering research issues in the past and we will continue to do so in the future.

SENATOR MIKULSKI: Do we have the information we need to prevent our own Armenian Disaster?

ANSWER: Based on the preliminary information gathered by the U.S. team that investigated the 1988 Armenian earthquake, it appears that an earthquake occurring in the U.S. with the same magnitude as the one that struck Armenia would cause less devastation. This is due in part to the knowledge gained under the National Earthquake Hazards Reduction Program and the increased implementation of mitigation and preparedness programs across the country. It is generally believed that buildings in the U.S. are designed and constructed better to resist earthquake motions and are built with higher quality materials than those in Armenia. However, significant damage and life loss would be expected if an earthquake similar to the Armenia earthquake were to occur near an eastern major city. Many regions at risk in the U.S. are carrying out preparedness planning which was not the case in Armenia and thus they would be in a better position to rapidly organize effective emergency response and recovery actions.

SENATOR MIKULSKI: In 1987, the National Earthquake Hazards Reduction Program was subjected to a comprehensive independent review by an Expert Review Committee. The committee made a number of recommendations, specifically that NSF should establish a program for upgrading earthquake experimental facilities. How has NSF responded to this recommendation of the review committee?

ANSWER: As part of NSF's research program, strong support is given to providing research funds for research equipment and instrumentation. Since the initiation of the earthquake engineering program at NSF in the early 1960s, support has been provided for establishing and upgrading research facilities. Recent support has been provided to either upgrade or aid establishing facilities at the following institutions.

- Earthquake Engineering Research Center at the University of California at Berkeley.
- The National Center for Earthquake Engineering Research at the State University of New York at Buffalo for the core experimental facilities at Buffalo, Lamont-Doherty Geological Observatory, Columbia University, Lehigh University, Cornell University, Princeton University and Rensselaer Polytechnic Institute.
- The Charles Lee Powell Structural Systems Laboratory at the University of California at San Diego.

NSF will continue to upgrade earthquake research experimental facilities in the future.

SENATOR MIKULSKI: Another recommendation of the Expert Review Committee was that NSF should focus its NEHRP funds in the Earth Sciences Division on activities that are clearly identified to be earthquake-related. How has NSF responded?

ANSWER: In November 1988 the Division of Earth Sciences (EAR) met with staff of Senate and House Committees with oversight for NEHRP to discuss the EAR response to the Expert Committee's recommendations. It was agreed that EAR would use a more rigid definition for reporting expenditures on earthquake related research. This has been followed for reporting of 1988 and 1989 funds. In addition, EAR has distributed an Announcement, "Proposal Preparation for Fundamental Earthquake Studies", to encourage proposals that more specifically relate to understanding earthquake mechanisms. It should be noted that there is no separate appropriation to NSF for earthquake-related research and that the NEHRP is supported out of the general research funds available to the Division.

SENATOR MIKULSKI: A third recommendation of the Expert Review Committee was that NSF should expand its societal response research program (social science research needed to help reduce earthquake hazards). How has NSF responded?

ANSWER: NSF has continued to support significant research in the societal response area. Research is being funded on such topics as the socioeconomic aspects of mitigation, earthquake preparedness planning, the impacts of earthquakes on critical urban systems, the response of emergency organizations to disaster, and community recovery from disaster. New research areas have also been identified and are now being pursued in this part of the program, including research on search and rescue in collapsed buildings and research on the causes of deaths and injuries in earthquakes. The areas that are being investigated track very closely with those recommended by the Expert Review Committee.

SENATOR MIKULSKI: A fourth recommendation of the Expert Review Committee was that NSF should encourage research efforts in industry by providing matching and multi-year funds.
How has NSF responded to this?

ANSWER: The NSF Earthquake Hazard Mitigation Program encourages research participation by industry. For example, NSF is sponsoring a seven-year coordinated multi-institution, multi-investigator research program in the Seismic Resistance of Reinforced Masonry Construction. Institutions from industry are participating directly in the conduct of the research and industry is also supporting the research with direct resources. This model is also being used in other programs such as those in base isolation research. The National Center for Earthquake Engineering Research at SUNY-Buffalo, and sponsored by NSF, is a five-year program funded by NSF at a level of $25 million with a requirement that the Center provide at least $25 million dollars in matching funds from non-Federal sources. Industry, both domestic and foreign, participates in the direct conduct of the research and also provides direct resources.

These examples, along with the NSF Presidential Young Investigator Program, are programs that encourage participation by industry in long term research programs.

SENATOR MIKULSKI: How adequate is NSF's funding to fulfill its responsibility under the Act, and especially to implement the recommendations of the review committee?

ANSWER: Given the current budget constraints that all government programs are facing, NSF's funding for earthquake research, although less than that recommended by the Expert Review Committee, is in line with other research priorities. In spite of the constrained funding, we feel that we are making significant progress toward fulfilling the key roles assigned to us under the Earthquake Hazards Reduction Act. This is partly because we have been able to leverage our funds with the establishment of the National Center for Earthquake Engineering Research in 1986. In addition to its NSF funding, the Center has acquired matching funds from other sources and thus has significantly expanded the work that is being done in the program on such subjects as earthquake strong ground motions, new buildings design, and lifeline research.

EARTHQUAKE RESEARCH: COMPETITIVENESS IN CONSTRUCTION TECHNOLOGY

SENATOR MIKULSKI: The Technology Policy Task Force of the House Committee on Science, Space, and Technology found that the U.S. is gradually losing its competitiveness in earthquake construction technology, and that the U.S. construction industry is losing market share in both U.S. and foreign markets. While at one time U.S. researchers, engineers and constructors were clearly the leaders in earthquake engineering, the United States is rapidly losing this leadership. Is the construction industry in general, and earthquake engineering in particular, like many other areas of U.S. technology where we lead in basic research, but lose our competitiveness because we are slow in translating our knowledge into products for the market place?

ANSWER: U.S. leadership in earthquake engineering and associated construction technologies are of concern to NSF. A Japanese construction company has recently signed a research agreement with a group of California universities for a multi- year, multi-million dollar earthquake engineering research program. NSF has several activities that help provide a competitive edge to U.S. companies and aid in translating research into products.

NSF supports three active information dissemination and technology transfer Centers. These are the Natural Hazards Information Center at the University of Colorado, the National Information Service for Earthquake Engineering at both the University of California at Berkeley and at the California Institute of Technology, and the National Center for Earthquake Engineering Research Information Service at SUNY-Buffalo.

An important part of our research program is international cooperative research activities. At the present time, NSF has formal active programs with Japan, New Zealand, the Peoples Republic of China, India, Taiwan, the USSR and Yugoslavia. These activities allow knowledge from other countries to be incorporated into the U.S. research base. Thus, these ideas can be used by U.S. professionals in their engineering and construction practice.

The NSF is establishing several research projects that use a knowledge base component from foreign sources. These projects include base isolation research projects; precast seismic structural systems; repair, retrofit, upgrade and strengthening projects; and large scale experimental projects in reinforced concrete, steel and masonry. Research results from these projects will provide a basis for increasing competitiveness. Translation of the research results to practice is enhanced by having industry and professionals participate in these projects.

NSF continues to provide funding in support of efforts to conduct post-earthquake investigations of damaging earthquakes in the U.S. and abroad. These post-earthquake audits are for the purpose of acquiring field data on the performance of buildings and other structures and the socioeconomic consequences of seismic events. As a result of these audits, research programs are focused and take advantage of the data to improve the U.S. knowledge in earthquake hazard mitigation.

Since timeliness is important in dissemination of research results, NSF will continue to encourage industry and practicing professionals to engage and participate in university research projects.

SENATOR MIKULSKI: What is the NSF doing to try to stimulate a greater amount of earthquake or construction research in the private sector and what should Congress do to help?

ANSWER: NSF is supportive of stimulating the private sector to do more research and development in earthquake engineering and construction. NSF encourages participation by the private sector in research activities and projects as observers, participants and as sponsors. The National Center for Earthquake Engineering Research at SUNY-Buffalo requires non-Federal matching of NSF funds on a one to one basis. The source of these matching funds are private industry and state agencies and amount to $5 million per year. Additionally, the private sector participates in the research projects at the Center.

NSF has a relationship with the National Institute of Building Sciences (NIBS) through the Building Seismic Safety Council (BSSC). The BSSC, whose primary support comes from FEMA, is a user of NSF funded earthquake engineering research. The most significant use of this research is for the development of the NEHRP Recommended Provisions in Earthquake-Resistant Building Design, 1988. The results of current NSF sponsored research form the basis for modifications of these provisions on a triennial basis. These provisions are one of the most significant contributions by BSSC (NIBS) in earthquake hazard mitigation.

As a result of NSF supported information dissemination and technology transfer programs, awareness of the importance of earthquake engineering and construction research has been raised. Congress has been supportive of NSF's efforts in the past and continued Congressional support is needed.

SENATOR MIKULSKI: What has the NSF done to respond to the complaints of practicing earthquake engineers in California that NSF-sponsored earthquake research is focused too little on near-term problems?

ANSWER: NSF does give significant attention to near-term engineering problems. For example, one of our research projects resulted in a useful methodology for retrofitting masonry buildings to resist seismic forces. Also, our rapid deployment of researchers to the site of actual earthquakes, such as the 1985 Mexico and 1988 Armenia earthquakes, has resulted in important practical lessons about which earthquake resistant building design and construction techniques work and which do not work well.

SENATOR MIKULSKI: What has the NSF done to respond to the complaints that NSF does not adequately consider the needs of practicing earthquake engineers?

ANSWER: NSF works very closely with leading practicing engineers and gives much attention to their needs. Practicing engineers are among our grantees and are often selected to serve on our advisory committees. We also interact with professional associations that represent the interests of practitioners. For example, we have involved such key organizations as the Earthquake Engineering Research Institute and the Applied Technology Council in our programs and this has resulted in our developing activities that are of particular concern to practicing engineers and other design professionals.

SENATOR MIKULSKI: What has the NSF done to respond to the complaint that NSF does not put enough emphasis on technology transfer?

ANSWER: A portion of our attention is devoted to technology and information dissemination activities. For example, we support the National Information Service for Earthquake Engineering at the University of California, Berkeley and at the California Institute of Technology which disseminates the latest technical information to professionals in the field through its library, computer software and publications programs. The National Center for Earthquake Engineering Research at Buffalo which we also fund, offers an information service for researchers, professionals and the general public. NSF provides funds to such professional organizations as the Earthquake Engineering Research Institute, the Applied Technology Council and the American Institute of Architects so that they can disseminate earthquake information to practicing engineers and architects. NSF also supports research to identify ways to improve technology transfer and information dissemination in the earthquake hazards mitigation field.

FUNDING FOR RESEARCH INSTRUMENTATION

SENATOR MIKULSKI: NSF support for analytical research instrumentation has been a top priority in several previous budget requests, but it does not appear as a theme or priority in the budget justification for the FY 1990 budget. What is the amount for research instrumentation in the FY 90 budget?

ANSWER: The Foundation's FY 1990 Request includes an estimated $227.7 million for instrumentation across all activities.

SENATOR MIKULSKI: Does this budget's treatment of analytical instrumentation imply a change in the Foundation's policy in support of research instrumentation in academic laboratories?

ANSWER: The Foundation's priorities for FY 1990 remain the same as they have for the past several years. NSF's priorities are: first, support for people, both in developing human resources and in research support; second, instrumentation for research and for education; third, support for larger, shared facilities.

SENATOR MIKULSKI: Could you provide for the record the annual NSF investment in research instrumentation in terms of total dollars, by program and Directorate, and as a percentage of the total Research and Related Activities budget for the period 1979-1989, and what is proposed in this area for FY 1990-93?

ANSWER: NSF funds for instrumentation for FY 1981-1989 are shown in the two tables below. Data for FY 1979 and FY 1980 are not comparable to that of subsequent years. Over the period FY 1990-1993, NSF is committed to boosting funding for scientific instrumentation, including support for developing and maintaining instruments. This goal is addressed in the Foundation's Long Range Plan for FY 1989-1993.

RESEARCH INSTRUMENTATION BY FISCAL YEAR
($ MILLIONS)

Directorate or Program	FY81	FY82	FY83	FY84	FY85	FY86	FY87	FY88	Est. FY89
Biological, Behavioral & Social Sciences	$15.2	$14.2	$16.2	$22.1	$24.1	$20.5	$34.7	$28.4	$30.0
Computer & Information Science & Engineering	1.7	1.8	2.0	1.9	5.3	22.6	22.9	13.0	15.2
Engineering	5.7	5.8	8.3	17.4	16.8	14.1	18.4	17.5	20.4
Geosciences	12.0	12.7	16.3	21.4	25.3	23.8	19.9	22.3	23.9
Mathematical & Physical Sciences	36.4	38.0	50.0	63.7	71.7	66.6	70.2	67.8	76.3
Science & Technology Centers	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0
Scientific, Technological & International Affairs	6.5	2.1	2.0	2.2	3.3	2.2	2.8	3.3	4.4
Science & Engineering Education	0.0	0.0	0.0	0.9	6.2	7.0	10.4	11.9	17.0
U.S. Antarctic Program	0.4	6.0	6.2	13.9	13.9	14.4	15.2	16.1	17.5
NSF, TOTAL	$77.8	$80.6	$100.9	$143.4	$166.6	$171.2	$194.4	$180.2	$204.7

NSF Investment in Research Instrumentation
FY 1981 - FY 1989

Fiscal Year	$ Millions	Percent of R&RA
1981	$ 77.8	8.6%
1982	80.6	8.9%
1983	100.9	10.1%
1984	143.5	12.5%
1985	166.6	12.7%
1986	171.2	13.2%
1987	194.4	13.8%
1988	180.2	12.4%
1989	204.7	12.9%

SENATOR MIKULSKI: Finally, could you provide a summary of the support provided by the other research agencies which a few years ago joined NSF in a special interagency committee to address the research equipment needs of research institutions? Are those agencies sustaining their commitment to invest in university research equipment?

ANSWER: "NSF has chaired the Interagency Working Group on University Research Instrumentation since it first came into being in 1981. The Group meets on an occasional basis and provides members with the opportunity to exchange information on the status of their agency's support for instrumentation and equipment at universities." NSF maintains a strong commitment in this area, with support for instrumentation in FY 1989 estimated at $204.7 million. Total Federal support for academic research instrumentation in FY 1987, the latest available year, was $525 million. However, the Foundation does not have detailed information on the level of commitment that other agencies will sustain for research instrumentation.

MATING BEHAVIOR IN SWORDFISH

SENATOR MIKULSKI: I noted that last June you made a $53,000 grant for a study entitled, "Maintenance of a Polymorphism in Mating Behavior in the Swordfish." While I'm sure that those of us who enjoy the taste of swordfish want to make sure they reproduce properly, I find it hard to believe this ranks at the top of the Foundation's priorities. Could you explain the relevance of this study and why we are spending as much on it as it would take to home 10 otherwise homeless families for an entire year?

ANSWER: The subject of this study is not the swordfish of the fishmongers, but a small guppy-like fish. This is a two-year postdoctoral fellowship for a promising young scientist. In addition to expanding the research experience of a new Ph.D., this excellent study promises to provide insight into evolutionary strategies using mathematics. Our cultural perspective today about the global environment and its effects on our species owes much to evolutionary studies.

PREHISTORIC POLITICAL ECONOMY OF UPPER PERU

SENATOR MIKULSKI: I note that last summer you awarded a $67,000 grant for two archaeologists to study "The Late Prehistoric Political Economy of the Upper Mantaro Valley in Peru." The researchers focused their excavations on the Wanka societies, and in particular, on the transformations that occurred in the political economy as a result of imperial occupation. What is the relevance of this work to the civilian research base in the U.S. and why is NSF choosing to fund it?

ANSWER: NSF is responsible for maintaining and improving the quality of science in the U.S. This responsibility extends to all scientific disciplines including anthropology, whose purpose is to describe and explain the human condition across all cultures and ways of life, and from pre-historic times to the present. Archaeology is especially important in providing a long-term perspective. This research project will provide insight into how large political organizations are formed and how powerful urban centers relate to rural subjects.

This distinction exists today and characterizes, for example, differences between many states in the U.S. The economic problems faced by agriculturally-based states - as they attempt to diversify their industrial base - are the same types as those faced by primitive cultures. This research has applicability to how this problem is influenced by the relationship that exists between urban and rural centers of population.

SEXUAL MIMICRY OF SWALLOWTAIL BUTTERFLIES

SENATOR MIKULSKI: I find it curious that you are funding a $105,000 behavioral study that compares the intra- and intersexual selection in the evolution of sex-limited mimicry of black and tiger swallowtail butterflies. Other than satisfying the interests of swallowtail butterfly enthusiasts, what application does this kind of research have on humans and why is it a priority funding item for the Foundation?

ANSWER: The proposal was highly regarded because it sheds light on a general phenomenon, so-called "balanced polymorphism," the continuing existence of two distinct color patterns within a species of butterfly. The male has one pattern, the female the other.

This project seeks to differentiate the natural selection forces that enable the survival, over time, of the two distinct forms in the population. Polymorphisms are common in most populations, including humans. The phenomenon is easier to study in species such as the butterfly because it is simple and obvious. This is research about the factors that affect the survivability of species, for example the things that enable one species to outcompete another.

INDIVIDUAL GRANT: SONG PRODUCTION IN FREELY BEHAVING BIRDS

SENATOR MIKULSKI: Following up as a second chorus on last year's discussion about magpie song research, I note the Foundation awarded a $213,000 grant to study the dynamics of song production in various species of freely behaving birds. I myself enjoy waking up to the sound of birds in the morning, but isn't funding a study like this really outside the Foundation's basic mission and purpose?

ANSWER: The learning and use of complex vocalizations is a biological phenomenon that is common to numerous species, including human beings. To understand general biological principles, it is important to examine many different species. For instance, to understand the general principles about how DNA works, we study it in simple organisms like bacteria and fruit flies. The principles gained from this work are applicable to all organisms, including humans. Similarly, research on vocal learning and the use of complex vocalization has broad applications that extend far beyond bird song.

Studies of vocal learning in birds have shed light on the acquisition of speech by humans and play a pivotal role in understanding how the brain functions. For example, for many years, it was thought that plasticity, the ability of the brain to adapt to change, was a property only of the developing Central Nervous System. The argument was that recovery of function could occur in young but not old people or animals. Recently, investigators interested in bird song demonstrated that the adult brain has great potential for modulation of functional organization. This research is leading toward identifying the events mediating neuronal plasticity in adults. The general biological principles gained from these studies may ultimately contribute to the treatment of adults suffering from brain damage.

LAW PROFESSOR'S IDENTITY

SENATOR MIKULSKI: I note that you've funded a $41,000 study entitled, "American Legal Realism, Empirical Social Science and the Law Professor's Professional Identity." The grant abstract says the research will attempt to explain why "scientific ideal inspired by the American Legal Realism movement has largely failed to be incorporated into the professional identity of those engaged in legal scholarship" and that this study is "fundamental to the field of law and social science." It would seem to me that NSF should be more concerned about the quality of science and math teachers than the identity of tenured law professors. Could you explain what warrants this study, and why it is funded through NSF?

ANSWER: The Law and Social Science Program provides support for interdisciplinary research in social science and law aimed at advancing and improving our knowledge about law and legal institutions. The referenced award seeks to provide a better understanding about how and why this field has developed. The project analyzes the causes and conditions that create a receptive or resistant atmosphere to scholarship in American legal education. Thus; it will advance our understanding of the growth of science and the legal factors that relate to or inhibit that growth.

INDIVIDUAL GRANT: LEGISLATIVE REDISTRICTING

SENATOR MIKULSKI: Along this same vein, I note another political science study funded by NSF for $37,000 on legislative redistricting. The research involves determining political representation in district based electoral systems. We are all interested in democratic processes and voter patterns, and so forth - why has NSF decided to fund this type of research? Is this type of research being duplicated elsewhere?

ANSWER: One important feature of our democratic system of representation is that we elect members of numerous legislatures from district-based electoral systems. District-based representation is thus a quite regular feature of most democracies. Many fewer nations change the district lines on a regular basis, and almost none do it in quite the way America does.

Despite the prevalence of district-based electoral systems, almost nothing is known about the effect of redistricting on the political system. Redistricting can increase or decrease the electoral responsiveness of our system - - the degree to which the division of parties in the legislature depends on the division of votes in the public. We also know that political gerrymandering can influence the fortunes of both political parties and racial and other groups. Unfortunately, although many assess the impact of redistricting on a political system through simple means, we cannot determine its effect on these deeper, more fundamental aspects of American politics by casual inspection of voting results. This research provides some of the first reliable measures of the democratic consequences of legislative redistricting. While numerous scholars have found these questions sufficiently important to study in some depth, none have applied sophisticated mathematical and statistical tools of rigorous social science research. This investigation is the first to apply these tools, and as such is the first to discover the effects of redistricting on these more fundamental aspects of American politics.

INDIVIDUAL GRANT: TIGER BEETLE CUTICLE

SENATOR MIKULSKI: You have devoted $47,000 to study the Tiger Beetle Cuticle. Apparently, the results of the research will help to elucidate the multifunctional significance of this multifunctional cuticle. If determined, what is the application of such findings?.

ANSWER: The cuticle of arthropods, including insects and spiders, is the complex external covering that serves as both their skeleton and skin. The adaptive success of arthropods, a group that accounts for more than 80% of the animal species on Earth, is due in large part to the protection afforded by the cuticle. This research on the desert-dwelling tiger beetle examines the role of the color, composition, and structure of the cuticle in the conservation of water and in the regulation of body temperature under extremes of high temperature and low humidity. The tiger beetle, which has evolved color patterns that blend perfectly with the sands of its habitat, is employed to study the adaptive compromise between the benefit of coloration for avoidance of predation on the one hand and the thermal consequences of light absorbance on the other. Other studies examine the role of lipids and waxes, formed within the cuticle, as barriers to effect water retention. With such information one can predict the parameters most important to the survival of species under extremes of radiant energy.

SENATOR MIKULSKI: What is its relevance?

ANSWER: Global change and loss of biodiversity are issues of great significance today. Studies of adaptive mechanisms for the survival of species under extremes of the environment are of major importance to the world and mankind. As parts of the temperate zones of the world become deserts and as species redistribute themselves along thermal gradients, it will be essential to understand the relative importance of biological structures, such as the insect cuticle, in the adaptive process. An understanding of those chemical and structural features of the insect cuticle important to insect survival may also allow the development of more efficient means of insect control.

INDIVIDUAL GRANT: TAXPAYER DECISIONS

SENATOR MIKULSKI: I note that you funded a study entitled, "Norms, Self-Interest and Taxpayer Decisions: Adaptations to 1986 Tax Reform" for $88,000 in 1987 and granted an additional $74,000 in 1988. Apparently, this study will add to our understanding on how citizens respond to the tax system. While this study seems worthwhile - we all might benefit from understanding the tax system a little better, why is NSF funding such a study?

ANSWER: In contemporary America, few issues are of more importance than having a better appreciation of why people obey laws and the complex sets of factors that engender compliance and deter disobedience. It is important to understand the public's reasoning about and perceptions of law in order to enable lawmakers to enact legislation informed about patterns of public compliance and responsiveness. The study of taxpayer behavior is a particularly appropriate setting for understanding the dynamics underlying compliance since it is an arena of law and legal enforcement that reaches almost all of our citizens. The referenced study systematically examines how citizens respond to the tax system and the determinants of individual adherence to law.

While this research was funded with a contribution of support from the Internal Revenue Service, no other federal agency has a primary responsibility for supporting basic research on the dynamics underlying compliance and the factors that produce prosocial behavior. Further, in addition to this project's contributing to a body of scientific knowledge, there are important short term gains to projects such as this. It has been estimated that noncompliance with federal income tax laws probably costs the government $80-$100 billion each year. This project and others supported at NSF in this tradition of work should provide valuable information and insights to legislators, policymakers, and others interested in understanding motivations for compliance with law and in forging processes which will make our systems work.

FLIGHT MUSCLE RATIOS IN FLYING INSECTS

SENATOR MIKULSKI: In 1988 you awarded $53,000 for a study entitled, "The Role of Flight Muscle Ratios in Aerial Interactions of Flying Insects." Apparently, recent results in this study suggest that animals with high flight muscle ratio - that is, the ratio of flight muscle mass to body mass - generally should be able to outperform those animals with lower flight muscle ratios. These results, according to the abstract, may demonstrate that mass allocation is a "profound problem" for flying insects. What is the significance of this study? As far as I am aware, most flying insects are able to fly without any problem--

ANSWER: This study examines pairs of related insect species that differ in dependence on flight, for example, to escape a predator or find a mate. Most flying insects fly in a variety of ways with distinct patterns of wing movement and flight. Many insect species must be able to achieve short bursts of rapid, maneuverable flight to survive, Research about flight can have applications in many areas of engineering.

INDIVIDUAL GRANT: COMPETITION BETWEEN CAVE STREAM COMMUNITIES

SENATOR MIKULSKI: A sizable grant - $220,000 - was awarded to researchers attempting to determine the role of competition between cave stream amphipods and isopods. The results of the study will be used to make predictions about successful and unsuccessful invasions, etc. What is the benefit to understanding how cave stream communities compete for space in riffles?

ANSWER: Competition is a fact of life for most animals on land and sea, but it is often difficult for an ecologist to quantify the extent and effect of these interactions. Cave streams offer a simple test situation. The result of a contest for space in a riffle, where the water moves forcefully, is for the loser to be washed away. Successful exploitation of a cave stream obviously depends on a population's maintaining its presence, that is, not being washed away. The outcome of competition can thus be readily quantified and in most natural situations this is difficult to do.

INDIVIDUAL GRANT: REPRODUCTIVE SUCCESS IN MUROID RODENTS

SENATOR MIKULSKI: I note yet another study on the reproductive practices of animals-A $180,000 grant was made for a project entitled, "Determinants of Reproductive Success in Muroid Rodents." This study tests hypotheses concerning sperm competition, mate choices, and determinants of social behavior with different species of rodents. What is the relevance of such a study and how is this study applicable to humans?

ANSWER: This project represents solid basic research on the reproductive strategies used by a number of muroid rodents. Muroid is a name given to a superfamily of rodents that include species of rats, mice and voles. We are all aware of the enormous health problems associated with rats and mice in urban areas. The damage to our Nation's crops by voles and other rodents is also a very severe problem with enormous economic consequences. Administering poisons for population control harms the environment and is not an adequate solution. Understanding "sperm competition" and "mate choice" may provide a non-invasive method for decreasing reproduction in these species. Thus, this basic research could have important applied relevance applicable in population control.

QUESTIONS SUBMITTED BY SENATOR FRANK R. LAUTENBERG

RESEARCH FACILITIES OFFICE

SENATOR LAUTENBERG: Section 204 of Public Law 100-570 requires the Director of the NSF to develop a comprehensive plan for this program. How far along is NSF in developing a comprehensive plan? Will it be submitted to Congress on June 15, 1989?

ANSWER: NSF has been gathering information and has held 6 public regional meetings attended by approximately 500 representatives of various eligible institutions. The draft Program Guidelines are expected to be published in the Federal Register the week of April 17 for a 30-day comment period. It is expected that the required report will be submitted to the Congress close to the June 15, 1989 due date.

SENATOR LAUTENBERG: Do you share the view, as expressed by the National Science Board in its March 1986 report, and as expressed by Congress in the findings and purposes section (Section 202) of the Academic Research Facilities Modernization Act, that "many national research and related education programs conducted by universities and colleges are now hindered by obsolete research buildings and equipment?"

ANSWER: The September 1988 report on Science and Engineering Research Facilities at Universities and Colleges: 1988, NSF 88-320, indicates that approximately 39% of the research space at universities and colleges requires major repair/renovation and that 16% of that space requires major repair/renovation. Research quality can be dependent on the adequacy of instrumentation and facilities. Thus, to the extent instrumentation and facilities are inadequate, the research may be adversely affected.

SUPERCOMPUTER-ADVANCED SCIENTIFIC COMPUTING

SENATOR LAUTENBERG: The NSF Supercomputer Centers program has been widely cited as an outstanding success. Many thousands of researchers in universities and industry have benefited from access to the latest technology in supercomputing provided by these Centers. The National Supercomputer Centers contribute to the nation's science and technology base, its international competitiveness, and its economic and intellectual strength. In order to provide the country's research scientists with leading edge supercomputer resources, will the NSF upgrade the Centers over the next several years?

ANSWER: The NSF is currently reviewing proposals from the five NSF Supercomputer Centers for renewal and upgrade. Since the technology advance very rapidly in the field of supercomputing, the highest priority is given to maintaining them at the leading edge. If funding is available our plans are to upgrade and replace supercomputers every three to five years to maintain scientific leadership at the Centers.

SENATOR LAUTENBERG: Will the NSF provide mass storage, visualization hardware and software, networks and other infrastructure commensurate with the scale of the supercomputers? Are these seen as a high priority?

ANSWER: Yes. A high priority is given to these system components necessary to maintain a complete working environment for research scientists and engineers. No supercomputing system is complete without the full range of other facilities such as mass storage, visualization hardware, networks, and the most efficient software.

SENATOR LAUTENBERG: Beyond having the Centers provide service on supercomputers, how will the NSF use the Centers to advance programs in scientific research, education, and technology transfer?

ANSWER: Research, education, and technology transfer are the key features of the next five years of the NSF program in advanced scientific computing. The Centers were required, in their renewal proposals, to plan for an enhanced research and education activities. As the NSF supercomputing initiative matures from the start-up phase of providing supercomputer access, increasing emphasis is being placed on software and algorithm research and development, expanding the education and human resources effort from the research scientist and graduate student level to increased undergraduate involvement, and enhanced coordination of these efforts among Centers.

Technology transfer from the Centers to industry and cooperation between computer vendors and the Centers has been one of the hallmarks of success of the Centers program. This effort will grow in the future as the National Centers increase software and systems improvement, and provide a testing ground for new products. The vendors support this effort through the donation of both equipment and personnel at the Centers. Industrial researchers are also collaborating with the Centers to an increasing degree, spreading new technologies developed at the Centers into their home laboratories. Finally, we expect strong interactions with the emerging new State and university Centers.

FUNDING FOR INDIVIDUAL INVESTIGATORS

SENATOR LAUTENBERG: I have heard concerns from some university faculty members in my state about funding for individual investigator initiated research. They do not believe that this type of research is being adequately funded by NSF. What is the NSF doing to address this concern?

ANSWER: The individual investigator is the mainstay of the American academic research enterprise. Just look at the recent breakthroughs in superconductivity at the University of Houston or in "fusion" at the University of Utah, if one needs examples. At NSF the individual investigator has been and will remain the cornerstone of our research support modes; individual investigator awards are more than 60 percent of NSF's research funding support. However, within the portfolio of support modes, NSF supports facilities, instrumentation, group activities, centers, and other research resources such as conferences and workshops. This is so because research problems have different magnitudes of scale. Some require a multidisciplinary approach with two, three or four principle investigators, while others require an interdisciplinary approach with teams of investigators, coördination and management, and access to large, central facilities.

SENATOR LAUTENBERG: I understand that you have raised the possibility of the NSF pulling out of certain fields of basic science research. I have heard concerns from university faculty members in my state about this possible action. They believe that NSF support is essential to long-term investigation of certain fields and that mission agencies provide more short-term and directed research. What are your plans in this regard?

ANSWER: In certain academic disciplines NSF is a very minor player within the total federal funding picture. A good example is elementary particle physics where NSF funding accounts for less than 10% of the total federal dollars going to support that field of investigation. Moreover, in that particular field the Department of Energy is the clear leader and has a mission to sustain academic research.

On the other hand, in certain academic disciplines NSF is the major player, or the only player, in town. Such disciplines include ground-based astronomy or environmental biology or earth sciences research.

Two points are made. The first is that under level budgets, or constricting budgets, NSF will continue to set priorities and to protect those areas for which it has the sole or major responsibility. The second is that mission agencies have a responsibility for the long-term support of the academic disciplines which provide the scientific underpinnings of their existence.

QUESTIONS SUBMITTED BY SENATOR DANIEL K. INOUYE

ASTRONOMY

SENATOR INOUYE: In lieu of funding the National New Technology Telescope (NNTT), it is my understanding that NSF is studying the possibility of funding two 8-meter national telescopes. Is NSF committed to funding two 8-meter national telescopes?

ANSWER: No. The possibility of funding two 8-meter telescopes is being studied, and our Long-Range Plan presently considers this a goal for optical astronomy. The National Optical Astronomy Observatories (NOAO) is preparing to submit a proposal to the National Science Foundation this summer which will propose building two 8-meter telescopes. This proposal will be extensively reviewed by the astronomical community and, if it passes this review, would require the approval of the National Science Foundation, the National Science Board, and the Adminstration before a request for funding is submitted to the Congress.

SENATOR INOUYE: Why is it that NSF plans to support the funding of the first 8-meter telescope only if substantial international participation in this project is obtained?

ANSWER: The National Science Foundation has not put this as an absolute condition for supporting this project. However, in light of the number of potentially excellent major science projects and the present limitations on funds, the National Science Foundation has been exploring the options and opportunities for sharing the funding of some major projects with other nations. Astronomical telescopes are attractive candidates for such cooperative ventures because all agree that major telescopes should go on the best possible sites.

SENATOR INOUYE: Your agency's budget has increased substantially since 1984. Yet it is noted that NSF funding for astronomy has in fact declined approximately 5% in real terms. Furthermore, new projects such as VLBA and GONG were absorbed within the declining astronomy budget, resulting in a sharp decline in funding support for universities and national centers approximately 15% in real terms. Please explain the reason for this apparent lack of support for Astronomy.

ANSWER: The Foundation has seen some recent growth in current dollars, but in real terms support for research and related activities at NSF has been almost level for several years. Under such constraints, difficult decisions about priorities have been made within disciplines, across disciplines, and across types of support (disciplinary research, facilities, centers, groups, education and human resources).

The Foundation's total budget requests reflect a process of long range planning and priority setting. A long-term view is taken of science and engineering research and national needs. In this context NSF has supported, in the last two decades, the highest priority projects identified by the ground-based astronomy community: the Very Large Array (VLA) at a cost of $79 million over period 1973 - 1980, and the Very Long Baseline Array (VLBA) with estimated cost of $81 million over the period 1984 - 1993. This represents substantial, capital-intensive investments in national facilities. Under fiscal constraints this commitment has reduced flexibility, but astronomy funding continues to work toward a balance between commitments to facilities serving the entire community, and other needs: research areas, support for development of human resources, development of new technologies.

SENATOR INOUYE: What is your plan to rejuvenate the nation's astronomy program in the aftermath of the collapse of the Green Bank Telescope? And, will this not require more than a single 8-meter telescope and a replacement for the Green Bank dish?

ANSWER: The National Science Foundation is supporting construction of the Very Long Baseline Array (VLBA) which is the highest-priority major new project for ground-based astronomy. Completion of this project is anticipated in FY 1993. The Very Large Array (VLA) continues as the premier instrument for radio astronomy in the world. The Hubble Space Telescope (HST) will provide unparalleled new capability for optical astronomy upon its scheduled launch by the National Aeronautics and Space Administration in early December of this year. Several non-Federal, large optical telescope projects are underway (the Keck Telescope) or are being planned (the Columbus and Magellan Projects). These will be available to segments of the U.S. community to complement efforts by the National Science Foundation.

A new long-range planning study for astronomy (a decade survey) is being organized under the auspices of the National Academy of Sciences. This study will address priorities for future facilities for both ground- and space-based astronomy for the 1990s.

PRIORITY SETTING

SENATOR INOUYE: How does NSF set priorities among science disciplines? Please explain the current process in which priorities are set within NSF.

ANSWER: There are various processes through which NSF sets priorities among science disciplines. First, NSF has an on-going planning process, assessed annually, which identifies important areas within and across disciplines. There are many inputs into this planning process, such as disciplinary and interdisciplinary advisory committee recommendations, special studies such as those done by the National Academy of Sciences, workshops, and the contributions of internal NSF program staff, a third of whom are one or two year visiting scientists and engineers from the nation's colleges and universities. The National Science Board holds a planning session each June to address the following year's budget and meets six times a year to discuss and act on specific projects. Within the context of this planning and agenda setting process, the top management of Foundation, with concurrence by the National Science Board, set specific priorities.

SENATOR INOUYE: Further, how can representatives from various scientific disciplines participate in setting interdisciplinary priorities?

ANSWER: Members from scientific disciplines participate in setting interdisciplinary priorities in several ways. First, the Top Managers of the Foundation, who represent various disciplines meet regularly to address issues, both interdisciplinary and disciplinary. All proposed actions are taken before the National Science Board, whose membership is interdisciplinary in nature. Representatives from various disciplines in the scientific community may serve as members of special interdisciplinary advisory committees, such as the Advanced Scientific Computing Advisory Committee, address issues that cut across and affect all disciplines or may serve on a interdisciplinary committee conducting one of many studies that have input into priority setting.

SENATOR INOUYE: Does the National Science Board have any opportunity to recommend funding priorities relative to the various disciplines before the budget is submitted to OMB?

ANSWER: Yes, the National Science Board meets every June for a two day planning session which addresses the priorities to be reflected in development of the budget request for the upcoming year. It also meets at its regular August session to discuss and approve the budget as it will be submitted to OMB. In addition, the National Science Board meets four other times a year to discuss NSF action and information items and comment on priorities.

SENATOR INOUYE: Major projects have been imposed on NSF science disciplines without an increase in their bottom line budgets. Ongoing programs have therefore starved, if not collapsed. In all candor, why then should projects not be funded as separate line items and absorbed within a larger base than in the budget?

ANSWER: Although many large projects are not separate line items in the budget, the Foundation has maintained and continues to maintain a balance between individual investigator awards and awards for larger projects. The percentage of the Research and Related budget devoted to large projects, either in the form of groups, centers, or major capital facilities, has remained relatively stable over the years, indicating that these larger projects have generally not been supported at the expense of individual investigator initiated awards. There is no indication that major projects have either starved or collapsed any other projects. Separate line items would complicate the budget presentation and make it more difficult to identify the overall amounts included in NSF budget for funding of disciplinary programs but would have no effect on NSF overall funding base. Since, such an action would yield no economic benefit, to the scientific community, there is no reason to modify the budget presentation. NSF does endeavor to modify the budget structures and organization whenever such action clarifies the budget presentation.

SENATOR INOUYE: With regards to the Exclusive Economic Zone (EEZ) of the United States, what roles can the Ocean Engineering and Ocean Sciences programs play relative to studying the resources of the EEZ within the Pacific?

ANSWER: To establish a balance response to the need for new technology to explore, characterize, and utilize the resources of the EEZ, a conference was in Honolulu in October of 1986 to assess the potential of the ocean resources. This conference brought together leaders from industry, government, and the academic community to develop recommendations for NSF's research programs in ocean technology. A follow on workshop was held at the University of California Scripps Institution of Oceanography in June 1987 to more sharply focus the research needs and the critical subareas of technology that NSF should focus on in the near future. The June meeting was attended by technologists who identified the following areas of research as the most critical:

a) Dynamics of structures in the ocean
b) Water column utilization
c) Seabed utilization
d) Automation for improving assessment and

work capabilities
e) Materials for ocean engineering application

Since the June 1987 Workshop, a joint program was established between the Ocean Engineering Program and the Ocean Sciences Program to encourage participation in this research area. A joint announcement was widely distributed, as were the detailed suggestions put forth in the Workshop report. As a result, proposals have been received by both NSF organizations and a number of joint projects have been funded that address the needs itemized above.

In addition, an engineering research center was established to focus on off-shore engineering and to help develop an educational infrastructure. A second initiative involved the establishment of a joint program with the French to cooperate in research to develop the technology needed to explore and utilize the EEZ resources. Sharing research facilities on an international scale is an important method of leveraging resources in a research area that requires expensive logistic support.

The Geosciences' contribution to this effort involves the study and understanding of the conditions that constitute, form and change the environment within the EEZ. Ocean Sciences programs in Biological Oceanography, Physical and Chemical Oceanography and Marine Geology and Geophysics all help to quantify the processes and conditions which control the formation and distribution of resources existing in the EEZ and to understand the processes which have changed and are changing this environment. Geosciences programs sponsoring Ocean Technology and Engineering are aimed at providing the scientific tools and techniques for physical measurements, collection of data, and scientific analysis necessary to our ability to study the EEZ.

SENATOR INOUYE: What role can NSF play relative to studying the effects of ozone depletion and global warming on our ocean ecosystems, specifically within the Pacific EEZ?

ANSWER: The National Science Foundation intends to play a major role through support of research on two programs within Global Ecosystems Dynamics, a component of its Global Geosciences program. The Directorates for Geosciences and for Biological, Behavioral and Social Science jointly support the Land Margin Ecosystems Research program, now in its second year. This program is designed to study ecosystems which are at the interface of the land and sea (e.g. wetlands, estuaries, coral reefs, coastal ocean), in order to predict the consequences of their unique vulnerability to potential global changes. Such changes might include: sea level rise, ocean and atmospheric warming, increase in pollutants and changes in incident radiation caused by reduced ozone levels. The U.S. Antarctic Program also supports research on the effects of increased ultraviolet radiation on biological systems due to ozone depletion. These programs would be of particular significance within the EEZ of the Pacific and other regions of the U.S.

Global Ocean Ecosystems Dynamics, is planned for an FY 1991 research start. The program will address the effects of global change on animal populations of the major oceans of the world, including the Pacific Ocean. Planning for this originated from a multi-agency sponsored academic community workshop in 1988. A steering committee of scientists has now been formed to develop a science program.

Furthermore, the interagency Committee on Earth Science is providing the leadership to ensure that federal efforts related to these environmental issues are effectively coordinated and focused on providing the best possible scientific information for policy decisions related to these issues.

QUESTIONS SUBMITTED BY SENATOR J. ROBERT KERREY

DOUBLING NSF's BUDGET

SENATOR KERREY: There are several references to the authorization goal of doubling NSF's budget. If we could wave a magic wand and triple that budget, what would you do that we're not doing now -- where would your focus be?

ANSWER: Our priorities would remain intact - people, instruments, and facilities, in that order. Doubling the Foundation's budget would help to achieve the priority NSF has established, namely to bolster education and human resources activities in order to secure a technologically literate workforce. But that would only be a start. Tripling the Foundation's budget would enable NSF to focus more resources on the instruments and facilities necessary to accomplish effective research and teaching as well as accomodate more of the excellent research proposals that we currently can not support. NSF faces major hurdles as major equipment and instruments built in the late 1950's and 1960's become obsolete as new research opportunities demand advanced or state-of-the-art facilities.

ATTRACTING STUDENTS TO SCIENCE AND ENGINEERING

SENATOR KERREY: Of all your testimony, I am most disturbed over the figures which suggest an abysmal ability in our nation to attract students to science and engineering careers. We have had federal efforts going back 30 years. We have had the space program to inspire. What is the problem? Do we really understand why we aren't attracting more students to these fields?

ANSWER: Many factors are responsible for our Nation's inability to attract more participation in science, engineering and mathematics. First, waning enthusiasm - the Nation's commitment to put a man on the moon by the end of the 1960's captured the imagination and spirit of the Nation and kindled an interest in engineering and "being an astronaut". When the goal was achieved, the general enthusiasm waned. Second, short-range or short-lived goals - too often the states and the government have to react to immediate educational and human resource needs. It is difficult in this society to sustain efforts over very long periods of time. We as a Nation sometimes forget that it takes, from kindergarden to Ph.D., about 22 years to produce a scientist or engineer. Many national issues will come and go over that period of time.

At NSF specifically, the NSF efforts of the 1950s and 1960s designed to prepare young people for careers in science, mathematics, and engineering were directed at those believed to be capable of high performance in those areas. We know now that that approach sometimes made these subjects LESS attractive to the majority of students, with two consequences: first, lower than desired numbers of young people elected to prepare themselves for careers in science, engineering, and mathematics; and, second, other students "shied away" from science and mathematics and thus received a general education less well-rounded than optimal for effective citizenship in today's world. By concentrating on the few, NSF may have unintentionly convinced the many that science and math were only for an elite few among them.

In recent years, NSF has moved to correct such errors in several ways. Foremost is its adoption of a policy that the objective of the Foundation's precollege educational programming is to improve the ability of all students to understand and use science and mathematics. Among other results, pursuit of this objective will broaden the pool of students from which future scientists may be drawn, rather than just improve the science potential of students who have already placed themselves in that pool.

SENATOR KERREY: NSF funds about half its grant applications and at half the request. In view of quality of applications and priorities, is this a reasonable percentage?

ANSWER: Actually, for the past several years NSF has funded about one-third of the "small" research grant applications reviewed each year, usually at one-half to two-thirds the amount requested. This "success rate" varies considerably among divisions and programs, some of which award only a quarter or a fifth of their campus-based, one-to-four investigator proposals. "Success rates" in many education programs and in centers programs are similar or lower.

Although the Foundation's budget has increased gradually in real terms, the overall number of proposals has increased each year throughout the 1980s, and the costs of each component (equipment, personnel, etc.) in the proposals has continued to rise.

Program officers and review panels almost unanimously report that they see many more meritorious proposals than can be funded. Many of these are top-rated, and others just below the top but still well worth funding. Program officers use their experience and judgement to make difficult choices among numerous strong proposals, taking many factors into account including efforts to build a broadly based national infrastructure in each field.

Given the number and quality of proposals, and the nature of the many scientific breakthroughs of recent years, the Foundation could confidently fund a great many more proposals in each field, at at higher dollar levels, with little chance of wasting appropriated funds.

SENATOR KERREY: Your applications are funded through a merit review process. How does this process now work and are national priorities incorporated into it? Do you get a number of experts in a field looking at the next steps in that field or is there some way to look at applications in broader terms?

ANSWER: National priorities such as research directions, encouragement of women and minority scientists, provision of specialized facilities, etc., are constantly incorporated at the Foundation-wide and division (field) levels through numerous closely-connected and active advisory bodies, through initiatives by the Foundation itself, in reaction to advice or reports from scientific and professional societies, and in response to guidance from the White House and the Congress.

Such advice and direction steers the system in many ways, for example, in setting priorities, funding levels and management approaches (e.g., the creation of specialized programs or Foundation-wide strategies). In addition, at the proposal review level the priorities are taken into account by program officers, who incorporate them into award/decline recommendations about individual proposals, along with the reviewers' comments and recommendations.

U.S COMPETITIVENESS

SENATOR KERREY: Over the years we have heard about spin-offs from DOD, NASA, and other programs. Do you see these spin-offs as advancing the U.S. industrial/competitive edge or are there, in your view, better ways to accomplish improvements in the U.S. competitive position?

ANSWER: These spin-offs from the mission agencies of the Federal government have indeed advanced the U.S. industrial position in many fields. Among these are the aircraft, computer, semiconductor, and instrumentation industries. However, these spin-offs in general do not represent a planned approach to the transfer of technology or the implementation of research-based knowledge. While it is not certain that a planned approach to the transfer of such knowledge and technology are a better approach, such planning can focus our efforts on those fields of science and technology in which the U.S. can gain and retain a competitive edge.

There are several programs at the Foundation which address the knowledge and technology transfer issue in a focused way: (1) The NSF "Centers" program -- including Industry/University Cooperative Centers, Engineering Research Centers, and Science and Technology Centers -- places emphasis on specific research areas using an interdisciplinary approach in concert with industrial partners; (2) the Foundation's Small Business Innovation Research (SBIR) program achieves a similar objective. In SBIR, all NSF-supported disciplines present their agenda for research to the small business community. A reviews of the operations of this program over the past decade indicated that about 40% of the projects, more than 400, have lead to improvements in manufacturing technology resulting in the development of new manufacturing tools, improved manufacturing methods, or improved quality control instruments.

SENATOR KERREY: There are some big costly programs in the budget - SDI, SSC, space station, for example. How do you see these efforts vis-a-vis NSF ones in terms of (a) scientific advancement in the U.S. and (b) improved competition in the international trade area?

ANSWER: The future of this country is people. NSF is about people. Educating them in pre-college, undergraduate and graduate school classrooms to become scientifically and technologically literate holds the promise for a society that will hold its own with any culture in the world. Without trained scientists and engineers in this country, scientific advancement will come to a standstill; without a technologically literate workforce in this country, our ability to compete in the international trade arena will suffer.

CURRICULUM DEVELOPMENT

SENATOR KERREY: NSF has been involved in a curriculum development program for several years now. (a) What do you see in terms of accomplishment in this program?

ANSWER: Attempts to measure accomplishments in the Instructional Materials Development (IMD) Program must be divided into two parts - the "ongoing program" as described in the Instructional Materials Development Program Announcement (NSF 88-29), and the "Publisher Initiative" projects that were grafted onto the ongoing program through a series of solicitations.

The ongoing program has resulted in the production of a vast array of materials that differ from each other in grade level, discipline, medium, and scope. Some of these projects have had remarkable impact. For example, "The Mechanical Universe", a set of video tapes to support a high school physics course, has been adopted by more than 2,000 institutions. On the other hand, some products, though of very high quality, have not been widely adopted.

During the past two years we have learned two things: 1) Small units of textual material are not readily absorbed into existing courses designed around a conventional textbook; it is more productive to support larger projects and/or projects that focus on materials that exploit modern technology, e.g., videotapes and computer software. 2) It is very important that the staff of projects we support include people with expertise in marketing to school districts. It is not enough to simply support creative materials developers.

The Publisher Initiative projects were conceived as a response to both of the issues recited in the previous paragraph. So far, we have made awards to eleven projects that will produce materials that are comprehensive (they will serve the needs of an adopting school district over a number of consecutive years) and easily adoptable (they have been packaged and marketed by firms that are expert in these processes). These awards were made relatively recently and it is not yet possible to measure their success. We have initiated a mid-course evaluation that may winnow the number of projects that are supported to completion. The evaluation of final accomplishment is still two years in the future, even for the earliest of the awards in this category.

SENATOR KERREY: (b) To what extent have these materials been incorporated into classroom programs?

ANSWER: In the first category mentioned -- awards through the "ongoing program" -- the adoption record varies enormously from project to project. While the record as a whole is disappointing to us, there are substantial numbers of huge successes. In the second category -- awards through the Publisher Initiative -- the finished materials have not yet been offered for adoption by the schools. Trial versions of the materials have attracted interest from large numbers of potential users, and there is no shortage of schools willing to serve as field-test sites.

SENATOR KERREY: (c) What more can you do?

ANSWER: Generally, we have not yet done enough for mathematics. A solicitation inviting proposals for projects focused on middle school mathematics is about to be released, and funding of projects stimulated by that solicitation will begin to round out our work at the elementary and middle school levels.

We have also done much too little for secondary school science and mathematics, partly because of a decision to "start at the beginning" with the elementary and middle school curricula in these subject. If more funds were available, the much needed program of secondary school projects could be supported simultaneously with those directed at the earlier grades. But, at current budget levels we must complete elementary projects before we begin to support secondary projects, even though it has been more than twenty years since NSF-sponsored projects like PSSC Physics, CHEMStudy, and BSCS Biology began their revolution of high school science.

Finally, we need to invest more in the development of two kinds of "instruments" for use in schools:

- One kind comprises the test instruments employed in schools to assess student achievement and progress in various subject matter areas. Existing test instruments are not appropriate for measuring the learning of students enrolled in science and mathematics courses that use novel instructional materials and new teaching methods. New and fair tests must be developed.
- The other kind of instrument comprises the large number and variety of equipment items, including some true instrumentation, employed in school science instruction. This equipment is often costly and designed more for teacher demonstration than hands-on use by students. There is abundant evidence that hands-on techniques are highly effective in promoting science learning. Accordingly, the Foundation must make a substantial investment in the development of new equipment and instrumentation that is much less expensive, more "student friendly," and much more accessible and available than good science instruction apparatus now is.

CENTERS AND GROUPS

SENATOR KERREY: Your request for research centers and groups totals $376 million in FY 1990. What centers and groups are you currently funding and what areas are they concentrating on? What types of programs would you expect to fund in 1990?

ANSWER: We support 18 Engineering Research Centers (ERC), 11 Science and Technology Centers (STC), nine Materials Research Labs (MRL), six Minority Research Centers of Excellence (MRCE), one Earthquake Center, three Biological Research Centers, one Plant Science Center, and one National Center for Geographic Information and Analysis. In addition, NSF supports about 50 Industry/University Cooperative Research Centers (IUCRC).

Areas of research include a rich mixure of activities. ERCs, for example, center around such diverse topics as hazardous substance control, optoelectronic computing systems, offshore technology, and plasma-aided manufacturing. The newly-established STCs examine such topics as high temperature superconductivity, high performance polymeric adhesives and composites, and analysis and prediction of storms.

In addition to continuing support for most of these research activities, the Foundation's FY 1990 Request includes funding for a second class of Science and Technology Centers. As with the first class of STCs, the Foundation will not select or target specific fields of science in advance. Thus, it is not possible to predict what types of programs will be funded.

Group activities supported by the Foundation include 16 Materials Research Groups, collaborative oceanography programs, the Joint Institute for Laboratory Astrophysics and the Global Atmosphere Research Program. Progress in some areas, such as materials research, demands that certain problems be solved by groups of investigators with diverse backgrounds. Areas of group concentration in the materials science and engineering discipline include research on the surface of silicon and studies of the environmental causes of cracking.

LEVERAGED FUNDS FROM INDUSTRY

SENATOR KERREY: You estimate industry contributions in support of NSF programs at $300 million for FY 1988. How did you derive that figure?

ANSWER: NSF surveyed all the programs that had an industrial cost-sharing component. Included in the term "cost-sharing" are cash contributions, equipment, such as computers, biological instrumentation and discount programs. Often equipment is substantially discounted by the manufacturers, e.g. by as much as 30 percent.

SENATOR KERRY: What are the principal industry contributions?

ANSWER: Among the programs which have a large industrial component are:

- MPS - Materials Research Laboratories where funding is directly related to MRL research activities, ($12.7 million from industry),

- ENG - Two mandatory cost sharing programs, Engineering Research Centers, ($20.6 million from industry), and Industry-University Cooperative Centers (IUCRC) which is leveraged at nearly 7:1,

- CISE - Advanced Scientific Computers ($24.2

million),

- o STIA - Small Business Industrial Research (SBIR) which has been leveraged at over 10:1 for its Phase III component,
- o SEE - Presidential Young Investigators program with an estimated leverage amount of $23.8 million.

SENATOR KERRY: Are there any patterns to industry support?

ANSWER: Between FY 1987 (when NSF first collected comparable data) and FY 1988, there have been increases both in the number of programs that have an industrial component and the total value of contributions. Totals for NSF without the SBIR component (which was not calculated the same way in FY 1987) show an approximate 10 percent increase for FY 1988, based on preliminary estimates.

ISSUES OF NATIONAL CONCERN

SENATOR KERREY: In your testimony you note that NSF has changed - "Where we once could operate with little regard to issues of national concern, we now focus our efforts and our role with those issues in mind."

When you talk of "issues of national concern" are you referring to things like ozone levels, climatic change, biodiversity or are you also referring to science and engineering education and research?

ANSWER: Yes, all of these and more - the Antarctic safety, environment and health initiative to name one, economic competitiveness and technology transfer another.

How do you actually determine and incorporate "national concerns"?

ANSWER: NSF gets input from its many advisory committees and panels as well as through reports. Reports such as those by the National Academy of Sciences, the National Research Council and the National Science Board influence priority setting most when there is broad consensus among scientists and engineers on reports' finding and recommendations. These reports heavily influence priority setting across the Foundation as well as within individual directorates and programs within directorates. Two good examples are:

- the National Science Board Report (86-10) Undergraduate Science, Mathematics and Engineering Education which continues to be the cornerstone of the Foundations undergraduate initiative, and
- the Seitz-Richardson report of July 1988, Report of

NSF Panel on Large Magnetic Fields, which developed a consensus within not only the materials science community, but also the Mathematical and Physical Sciences disciplines in general to support the project which NSF now proposes for initial construction activities in FY 1990.

Both of these examples were discussed during the Foundations annual long-range planning exercise as well as at the annual August National Science Board meeting to set priorities for the coming fiscal year's proposed budget to the President's Office of Management and Budget.

PRIORITY SETTING

SENATOR KERREY: In your testimony, you note that there is a "continuing need to set priorities across fields of science and engineering and among many competing initiatives of importance and high merit." Tell me how you set these priorities - what is your process for determining them?

ANSWER: There are various processes through which NSF sets priorities among science disciplines. First, NSF has an on-going planning process, assessed yearly, which identifies important areas within and across disciplines. There are many inputs into this planning process, such as disciplinary and interdisciplinary advisory committees, special studies such as those done by the National Academy of Sciences, workshops, and the contributions of internal NSF program staff, a third of whom are one or two year "rotators" from the nation's colleges and universities. In addition, the National Science Board holds a yearly planning session each June to address the following year's budget as well as meets six times a year to discuss and act on specific projects. Within the context of this planning and agenda setting process, the Foundation director as well as Assistant Directors who represent each discipline, with concurrence by the National Science Board, set specific priorities.

SENATOR KERREY: In your statement, you refer to the biodiversity initiative. Could you tell me where you are in this?

ANSWER: NSF, through its Systematic Biology Program and other programs in the Division of Biotic Systems and Resources, has a long history of supporting research providing knowledge that underpins what we know about the variety and variability of living organisms and their ecological habitats across the earth. This support provides over 90% of the basic research in the critical area of systematic biology by college and university scientists and their students devoted to the scientific basis of biodiversity. Furthermore, our contribution is approximately 40% of total research expenditure of all countries and U.S. leadership is widely acknowledged and expected.

The National Science Board undertook a study beginning in October, 1987 to assess the national and international scientific needs, and especially what the NSF should do. That study should be available in the near future.

NSF has considered the deliberations of the NSB and other expert groups in establishing priorities. The biodiversity initiative represents 43% of the additional funds requested in BBS for "Disciplinary Research and Facilities." The resources are proposed for distribution across the relevant programs of the Directorate to begin to address the multi-faceted needs of the problem.

The problem of loss of biological diversity is so serious to the U.S. as well as the World that this initiative must go forward. The consequences of losing our heritage of biological diversity, aside from the obvious scientific reasons, have serious social and economic ramifications, especially for less developed countries. It is important that we understand and conserve biodiversity.

U.S COMPETITIVENESS

SENATOR KERREY: I have read various hypotheses regarding the lack of U.S. competitiveness in world markets including (1) the U.S. has caught the British malaise, (2) there is a flabby overstaffed management in many companies, (3) the budget and trade deficits are debilitating, (4) neither the U.S. government nor industry have put their research resources in the proper places.

Do you have a favorite theory or explanation?

ANSWER: There are various contributing factors involved. We know that in some individual cases industry dropped the ball on several big technological developments. We know from many recent reports that our precollege educational system is producing students less well prepared to function in a technological society than students in other countries. In order for the U.S. to mobilize itself to be better prepared to compete in world markets it will require concerted, combined efforts on the part of the government, industry, the states and the citizenry. The Federal Government will act as the catalyst and as the leader for national direction and change, but industry and the states must bear much of the responsibility to implement that change.

SENATOR KERREY: A CRS publication notes, "when comparing U.S. technological enterprise to that of our trade competitors an interesting pattern emerges. While the U.S. has the highest absolute totals of many of the indicators of innovation (including manufacturing productivity, number of science and engineering degrees awarded, number of patents granted and share of worldwide high technology trade), the growth rates are less than those of other nations. In addition, other nations appear more successful in converting the results of R&D into technologies and techniques which are competitive in global commercial markets.

Do you agree with the assessment?

How would you deal with it in order to improve U.S. productivity?

ANSWER: It is true that the U.S. is still a leader with regard to many indicators of technology and innovation. It is also correct to note that some other countries have been increasing at faster rates. To some extent their lower base compared to the U.S. enables more rapid increases.

Improvement in U.S. productivity is largely the responsibility of the private sector. However, actions to stimulate private sector investment in longer-term research would include:

- making permanent the R&D incremental tax credit;
- developing more effective protection for intellectual property both at home and abroad;
- encouraging industrial R&D consortia concentrating on generic non-proprietary R&D;
- ensuring an adequate supply of well-trained scientists and engineers; and,
- increasing tax deductions for industrial support of academic research.

SENATOR KERREY: The CRS publication noted above suggests that one problem in the U.S. is that much technology-related R&D is responsive to Federal needs rather than those of the civilian marketplace.

Would you agree with that?

Is there a way to channel more into the marketplace?

And if so, should the U.S. look at that from a policy standpoint?

ANSWER: First, you should note that, each year, only about half U.S. R&D support comes from the Federal government. The remainder comes from American industry and other sources. Much of the Federal government's portion is directed at solving problems for the mission agencies. In many instances, this R&D has made significant contributions to the private sector economy. Examples range from the nation's aircraft to its semiconductor industries. A current example which might be cited in this regard is SEMATECH, jointly supported by DARPA and industry, with a charge to development massive improvements in the manufacture of semiconductors. Thus, while a significant fraction of the Federal R&D expenditures is directed at mission agency needs, this is not necessarily bad.

Some methods do exist for channeling output from Federal R&D into the marketplace. One example is the "Federal Laboratory Consortium" which has as its objective the enhancement of the commercial potential of the research carried out in these laboratories. These activities come under the general heading of technology transfer activities. You should note that, unlike our competitors, the U.S. has not achieved consensus on a more proactive Government role on commercial technology. Nonetheless certain things can be done to channel more R&D results into the marketplace. The provisions of the Omnibus Trade and Competitiveness Act of 1988 are a start in that direction. We can and should get more civilian benefits out of the important R&D efforts funded by the Government. We can encourage and provide incentives for more academic-industry-Government cooperation and collaboration since knowledge and technology transfer are best accomplished by a transfer of people. The cooperation that now exists between industry and universities, as well as the mobility of scientists and engineers in the U.S. are much higher than in our competitor nations.

Finally, while the question of accelerating the application of R&D results in the private sector is a valid policy question, it should be noted that not only is the availability of new technology important, but there must also be a willingness on the part of the private sector to make the investments to use such new technology. Federal R&D efforts can only furnish the technology base. It is industry's business to use this base in the marketplace.

STATE OF NEBRASKA

SENATOR KERREY: You provided me with a breakdown showing awards to Nebraska of $4.7 million in 1988. How would you characterize our state's efforts. Are we stronger in some areas than others? Are there areas where we could do more?

ANSWER: In FY 1988, nearly two-thirds of Foundation funding to Nebraska was awarded through the Directorates for Geosciences (mostly in the Division of Polar Programs) and Mathematical and Physical Sciences (predominately in Chemistry). A well conceived strategy could be assist in broadening Nebraska's science and engineering base to other areas such as engineering and computer sciences.

The Foundation's Experimental Program to Stimulate Competitive Research (EPSCoR) has as its objective the improvement of the science and engineering infrastructure in those States which have been less successful in competing for Federal R&D dollars. While Nebraska is not among these States, the basic principles of this long-term developmental strategy would apply. Namely, analyze the current science and technology base to identify those areas in which Nebraska is at the competitive margin and develop a plan to move the State into a position of national competitiveness. It is also essential to develop strong creative leadership and a State-wide commitment to building the research enterprise; to create a strong science and engineering education base; and to stimulate collaboration between R&D performers (including government, academia, and industry).

SENATOR KERRY: I would appreciate more specific information on the Safety, Environmental and Health Initiative. Specifically:

--what are the initiative's priorities?
--what is the timetable for implementation?
--what is the breakdown of how the Initiative's funds are to be spent?

ANSWER: The top priority for the initiative is for equipment needed to increase air safety, particularly for precision landings and air traffic control at McMurdo Station. In the environmental area the top priorities are related to solid and liquid waste disposal and for environmental monitoring. Additional planning and assessment of priorities will be done by the new Safety, Environment and Health Officer whom the Foundation's Division of Polar Programs expects to hire shortly, general outlines are clear.

Of the $10 million requested for FY 1990, $5.2 million will be used for environmental affairs; $3.3 million for projects related to safety and health; and $1.5 million for an increase to the base budget. Additional funding for the initiative over the period FY 1991 - FY 1994 is estimated at $170 million.

SENATOR KERRY: When will the NSF make available to this committee the 'master plan' detailing which projects are priorities, and outlining implementation schedules including expected starting dates and completion dates for each project?

ANSWER: A 'master plan' of the type envisioned in your question will be a task for the new Safety, Environmnet and Health Officer (SEHO) and for the Head of the SEH Implementation Team, a position for which recruitment will start soon. It will depend in no small part on funding. An initial plan should be available in six to eight months.

SENATOR KERRY: Has the NSF considered the establishment of a comprehensive environmental monitoring program that includes on-going sampling and analysis of soil, sediments, effluent, leachates and exhaust emissions? If not, why not? And if so, could you provide me with information regarding such a program and an implementation timetable.

ANSWER: The National Science Foundation has provided for scientifically-based, comprehensive, and on-going environmental monitoring programs that involve sampling and analysis in its Environmental Protection Agenda released in August 1988. The Agenda explicitly recognizes that formal, scientifically-based monitoring is needed to understand environmental change and to mitigate environmental impacts.

Prior to this year, NSF had no comprehensive monitoring programs focused solely on the impacts of its antarctic operations. Occasional studies were undertaken but they were not part of a coherent environmental monitoring framework. In addition, NSF grantees were often reluctant to contribute to such efforts, as monitoring has been viewed as a second-rate undertaking when compared with basic scientific research. The Agenda notes that NSF grantees need to be encouraged to include monitoring efforts in their basic research projects. It also states that the type, amount, suitability, and ramifications of NSF's antarctic environmental monitoring efforts must be reviewed periodically and jointly by the U.S. Antarctic Program (USAP) administrators, appropriate support contractors, and the scientific community.

During the past austral research season (1988-1989), NSF has made substantial progress in designing and implementing such monitoring activities within severe resource limitations. The USAP initiated its first comprehensive, scientifically-based drinking water and wastewater (sewage effluent) monitoring programs. Drinking water from McMurdo Station, Williams Field, and Amundsen-Scott South Pole Station and wastewater from McMurdo Station are now being analyzed by New Zealand's national water testing facility. Preliminary results indicate that all drinking water samples comply with U.S. standards for inorganic substances. Results on organic substances in drinking water and on inorganic and organic substances in wastewater are forthcoming in a comprehensive final report. The USAP intends to continue this monitoring program next year with emphasis on measuring substances in McMurdo's wastewater and in seawater near McMurdo. The USAP is now planning a monitoring program to determine a baseline for trace metals and contaminants in substrates (soil, ice, and snow) in the environs of its stations. The Program also initiated a program to characterize environmental conditions in and near the old Winter Quarters Bay dump at McMurdo Station. Surveys were conducted by NSF grantees who examined marine biota, inorganics, and such organic substances as PCBs. While interpretation is incomplete, the results do indicate that: 1) high levels of certain organic substances and solid wastes are localized in limited areas of Winter Quarters Bay; 2) within these localized areas, the normally expected population levels of marine biota of McMurdo Sound have decreased; 3) within short distances of these localized areas, population levels of these biota return to normal for McMurdo Sound.

The Agenda specifically calls for the assessment of monitoring needs and opportunities during mid-1990, and again in mid-1992, in conjunction with its recommended biennial planning reviews. To provide a solid basis for future USAP environmental monitoring activities, NSF has included as part of its Special Safety, Environment and Health Initiative plans for an expert workshop to assess the types of monitoring that will be useful in the operation of its stations and in its antarctic environmental management and protection efforts. Guidance from the workshop will be translated into a scientifically-based, comprehensive, long-term monitoring program. NSF recognizes that achieving comprehensive and meaningful monitoring programs requires substantial amounts of time spent in planning.

SENATOR KERRY: Is the NSF aware of the reports of elevated levels of heavy metals in the effluent outflow at the McMurdo Station? Has the NSF investigated these reports? Aside from submerging the outfalls and installing macerators at both Palmer and McMurdo bases, which will do nothing to address the actual content of the effluent, what does the NSF plan to do about this problem?

ANSWER: NSF is aware of a technical note circulated by Greenpeace that indicates elevated levels of heavy metals in McMurdo Station's effluent. NSF first received the report in December 1988 from the New Zealand Antarctic Programme (whose Scott Base was also characterized in the note). Review of the note by our environmental specialist indicated that the lack of acceptable methods descriptions made judging of the reliability of Greenpeace's conclusions impossible. We have also received copies of reviews of the note solicited by the New Zealand Antarctic Programme. These reviews also provide cautions about the scientifically tenuous nature of the technical note due to possible problems with methodology.

The NSF recognizes that, in general, with respect to toxic or hazardous pollutants, maceration of sewage and submerging of wastewater outfalls do little to change the pollutant content of effluents. Such treatments do, however, improve the characteristics of wastewater if such pollutants are not present. Such pollutants are neither intentionally nor normally introduced into USAP's wastewater. The USAP has policies that prohibit the input of such pollutants into drains and procedures for handling and disposing of such pollutants. The USAP works hard to enforce these policies; however, occasions might occur when individuals disregard the policies or circumvent the procedures. It is intended that comprehensive environmental monitoring programs will provide evidence of any such disregard; through investigation such individuals can be identified and appropriately dealt with. Should monitoring evidence show the continuous presence of certain pollutants in its effluents (i.e., not attributable to individual negligence but to operational problems), the USAP will employ its resources to mitigate the problem's source.

SENATOR KERRY: The Initiative states that the NSF will study the possibility of installing an incinerator at Fortress Rock. However, the Safety Panel report, upon which the initiative is based, suggests either installing an incinerator or retrograding combustible wastes as possible alternatives to current practices. To what extent was retrograding studied? And why is it not being considered in the Initiative?

ANSWER: Retrograding of materials is a current practice of the USAP that continues to increase in both the amounts and types of materials removed, and it is undergoing further study. The Safety Panel report suggested, in addition to installing an incinerator, retrograding a wider variety of materials. In assessement of an incinerator, alternatives including greatly increased retrograde will be considered.

QUESTIONS SUBMITTED BY SENATOR CHARLES E. GRASSLEY

SCIENTIFIC RESEARCH AND TECHNOLOGICAL DEVELOPMENT

SENATOR GRASSLEY: Donald Kennedy, President of Stanford University, said in a speech to the AAAS in January:

"To the extent that the 1980's have been kind to science, it has been for the most practical reasons. International competitiveness has become the research buzz-word of the decade, and it is small wonder that we have been willing to link our future to the powerful political energy it has provided. Thus, we have tended to justify, and sometimes oversell, our science on utilitarian grounds."

Mr. Bloch, do you believe that scientific research and technological development have been over-sold as a means to enhance the economic competitiveness of the United States?

ANSWER: No. Without firm scientific underpinnings and the trained people to utilize that scientific base, industry has no base upon which to develop technology and that, of course, has a direct bearing on economic competitiveness. As the NSF has said before, we need to realize that public funding of science makes a critical difference in economic competitiveness. However, it must be understood that not all science will be utilitarian, nor will it all lead to enhanced economic competitiveness.

NATIONAL HIGH MAGNETIC FIELD LABORATORY

SENATOR GRASSLEY: Mr. Bloch, The FY90 NSF budget request includes $12 million for construction of a new High Magnetic Field Facility. I understand that such a facility is currently in place at MIT and this budget request would replace that existing facility. Please tell me why NSF is holding an open competition for the new facility rather than locating it at MIT again?

ANSWER: A panel of national experts reported to NSF on the critical importance of a new national high magnetic field laboratory ("Report of NSF Panel on Large Magnetic Fields," July 1988). The report recommended that this major new facility be established on the basis of an open competition. There exist a number of institutions with considerable expertise in this area.

GERM PLASM AND REAGENT BANKS

SENATOR GRASSLEY: The NSF FY89 -FY93 Long Range Plan states that efforts to develop research resources in the Biological, Behavioral and Social Science will include NSF support for germ plasm and reagent banks. Can you tell me more about the agency's plans and interests in the establishment of germ plasm banks?

ANSWER: Living stock centers provide essential tools for biological researchers. Our modern biotechnological procedures are only possible because defined organisms are available to provide the raw material (germplasm) for biological manipulation and to act as vectors for inserting genes into other organisms. Living stock centers maintain rigorously characterized strains of organisms for use by the biological community, as well as providing information on the properties and potential uses of those strains. Many stock centers are also the major sites of mapping for their organisms or maintain stocks of particular use to mappers.

NSF currently funds 17 living stock centers. However, there are no centers for several kinds of biologically important organisms (e.g., non-pathogenic viruses, insects [other than the fruit fly, Drosophila], marine invertebrates), a situation that NSF intends to correct. In addition, NSF sees as a high priority the preparation of databases on the strains in stock centers, in order to make those data more readily available to the scientific community. Finally, as mapping of the genomes of humans and other organisms continue, we must provide funding to allow living stock centers to serve as the long-term repositories for the sequenced pieces of DNA.

INTER-AGENCY PLANT SCIENCE CENTERS

SENATOR GRASSLEY: The NSF FY90 Budget Request and the FY90 DOE Budget Request do not include any funding for new awards in the USDA/DOE/NSF inter-agency plant science centers program. The USDA FY90 Budget Request includes $3.4 million for the program. Only one round of awards has been made in the program with three centers having been established at Cornell, Michigan State, and Arizona State.

Why does the NSF FY90 Budget request not include funding for the Inter-agency plant science centers program? Why would NSF participate in a program like this only to support one round of awards?

ANSWER: Original plans for the plant science center program were for a five year program with new awards to be made in each year. NSF made their award of $5.7 million to 5-year grant for establishment of a plant science center at Cornell in FY 1988.

However, following the FY89 appropriation and the tight funding situation, particularly at USDA and DOE, a commitment for continued new funding could not be made. This was the current situation at the time of the development of the FY90 Budget Request for NSF. However, discussions have been reopened between the three agencies, USDA, NSF, and DOE, on continuation of the program.

SCIENCE AND TECHNOLOGY CENTERS

SENATOR GRASSLEY: Former President Reagan described the NSF Science and Technology Centers Program as one way to protect the nation's ability to compete in international markets. Do you view this program as a means to improve the economic competitiveness of the United States?

ANSWER: The NSF Science and Technology Research Centers Program was established to help maintain U.S. predominance in science and technology and ensure the requisite pool of scientists with the quality and breadth of experience required to meet the changing needs of science and society - ingredients essential to economic competitiveness.

The Science and Technology Centers (STCs) will enhance U.S. competitiveness by exploiting opportunities in science and technology where the complexity of the research or the resources needed to solve these problem require the advantages of scale, duration and/or equipment or facilities that can best be provided by a campus-based research center. The planned support lifetime for STCs, up to eleven years, encourages more risk taking, and this is expected to pay off in major ways for the nation.

STCs contribute to our economic competitiveness to a large extent through education and knowledge transfer. The enhanced level of exposure to cross-disciplinary research in state-of-the-art scientific areas prepares undergraduate, graduate, and postdoctoral students to transfer their knowledge to the private sector, as well as to teach others in an academic setting.

Each Center is connected to other institutions and will build bridges to other sectors. Students educated at one university frequently move to other regions of the country to enter the private sector or other academic institutions. The ultimate impact of the STCs will expand far beyond the institution that received the award. Thus each Center is to produce a highly skilled technical workforce while engaging in cutting-edge science, both of which will benefit the nation.

SENATOR GRASSLEY: Four of NSF's eleven Science and Technology Centers (which were awarded in December 1988) were awarded to universities in California, or included a California institution as a collaborator.

Funding for the three centers hosted by California institutions represents about 30% of total funding for the program. In addition, the University of Illinois was awarded a center with Northwestern as a collaborator -- and Northwestern University was awarded a center with the University of Illinois as a collaborator.

If the Science and Technology Centers Program is a means to improve the economic competitiveness of the United States, what implications might it have regional and state economies of the Country?

Do you believe that the award of three of the first eleven Science and Technology Centers to California institutions will have economic impact on the California State economy?

ANSWER: There were 48 proposals of the initial 323 which were identified as "finalists" in the first STC competition. The final multidisciplinary panel which reviewed these 48 proposals unanimously agreed that 18 merited funding as centers; of these, 6 proposals were from institutions in California. These 18 were further subdivided by the panel into two unranked groups, a top group of 6 and the remaining 12. The "top" 6 proposals were recommended for funding under any NSF budget scenario; 3 of the top six were from California. The University of Illinois proposal was also among these top 6. Thus 4 of the institutions referenced in this question were among the top 6 of the original 323 proposals. All of the previous reviewers of these proposals (mail, initial panel, site visitors) stated that the activities proposed were unique and of the highest caliber.

It is expected that over their lifetimes the 3 STCs in California will contribute more to the national economy than to that of California via two avenues: knowledge transfer, and the scientific output generated. For example, the techniques and equipment to be developed in biotechnology at one California STC will be available to the national community. These will feed potential improvements in all areas of biotechnology, and are anticipated to be of use in mapping the human genome. Another California center will contribute substantially to the infrastructure necessary to produce ultra-small components for virtually all devices relying on transistors and chips. The extremely sensitive detectors being developed at the third California center have the possibility to impact advanced medical sensors. These are all issues of national importance.

The center which included a California institution as a collaborator is concentrating on parallel computation. This center, however, is based at Rice University in Texas. The fact that it is a Texas center is underscored by the investment of $1M the State of Texas will make in each of its first five years of operation. This work will impact virtually all scientific computing done in the U.S. over this time period.

The University of Illinois superconductivity center addresses one of the most important scientific discoveries of our generation. The cooperation with Northwestern University (and University of Chicago and Argonne National Laboratory) scientists represents the pooling of complementary scientific talent in an effort to compete more effectively in an area targeted by Japan.

The Northwestern center includes many of the leading scientists in the area of cementitious materials. This includes scientists from Illinois as well as from Purdue and the National Institute of Standards and Technology. This is a much overlooked area, with extraordinary financial impact on the country (more than $1 trillion for maintenance/repair as reported by the NRC), that is currently being exploited by both European and Japanese investigators.

GEOGRAPHIC DISTRIBUTION

SENATOR GRASSLEY: The National Science Foundation Organizational Act includes the provision that "...it shall be an objective of the Foundation to strengthen research and education in the sciences and engineering, including independent research by individuals, throughout the United States, and to avoid undue concentration of such research and education."

Please describe for me the kinds of efforts being made by the National Science Foundation to avoid the undue geographical concentration of its funding for research and education programs.

ANSWER: It is the Foundation's objective to strengthen research and education in the sciences and engineering throughout the United States and to avoid undue geographic concentration in funding. While it is true that the NSF review procedure emphasizes scientific merit, one of our standard review criteria specifically places emphasis on a project's potential for improving our scientific and engineering infrastructure. It is this criterion that specifically enables us to redress potential inequities in the geographic distribution of our funding.

The Foundation is very sensitive to providing broad support for science and engineering throughout the United States. The research centers program (both Engineering Research Centers and Science and Technology Centers) have widespread geographic distribution. In addition, the Foundation has a model program that is designed to build the science and engineering infrastructure in States that have traditionally been unsuccessful in competing for Federal R&D support. The Experimental Program to Stimulate Competitive Research (EPSCoR) has been successful in helping sixteen States and Puerto Rico build more competitive individuals and programs. EPSCoR will be continued for another 5-7 years with emphasis on State commitment and State initiatives. We have high hopes for success under this program.

MATERIALS RESEARCH LABORATORIES (MRL) AND GROUPS (MRG)

SENATOR GRASSLEY: The NSF FY90 budget request includes a $1.94 million increase in Materials Research Laboratories and Groups. Please describe for me how this increase will be used. Are there particular problems in areas of research targeted for attention with this increase?

ANSWER: Of the $1.94 million increase requested for the Materials Research Laboratories (MRL) and Groups (MRG), $0.90 million is intended for the MRL Program and $1.04 million for the MRG Program. The increase for the MRL's will be used to upgrade their central facilities and to generally strengthen their multidisciplinary research and education efforts. The increase for the MRG Program will be used to start two new groups reflecting the importance of and need for multidisciplinary efforts to address complex problems in materials research. No particular areas have been targeted. The new groups will be selected on the basis of merit review.

SENATOR GRASSLEY: Mr. Bloch, it is my understanding you desire to elaborate further on my question of April 3 regarding the NSF project manager who told a researcher in my state never to apply for funding again for reasons that had nothing to do with the technical merit of any past or future proposals. Please clarify your response.

ANSWER: I was notified on October 26, 1988 by Iowa State University President Eaton of the remarks attributed to an NSf program manager concerning the fate of future proposals that might be submitted by the university. It was clearly inappropriate for the program manager to have said this or to even have left the university with this impression. I conveyed this view to that program manager in a direct and unmistakable manner. After that I sent a letter dated November 3, 1988 to President Eaton in which I said, "...I want to provide you with my own personal assurances that this issue will have no impact upon any current or future proposals that Iowa State may wish to submit to NSF. All proposals submitted to the Foundation will be fairly and objectively evaluated on the basis of its merits and that will be the basis upon which any funding decision is made." That was, and remains today, the position of the Foundation.

MERIT REVIEW SYSTEM

SENATOR GRASSLEY: My purpose in using the example referred to in Question 9 was to learn what internal procedures NSF uses to monitor the merit review system. Can you further clarify as well what checks there are in place to prevent threats of this type from occurring?

ANSWER: Several safeguards have been built in over the years to ensure an open and fair system:

(1) Conflicts of Interest: Reviewers and program officers are asked to identify any academic affiliations, personal relationships or financial interests that could constitute or be regarded as a conflict, and to withdraw from the decision process if warranted.

(2) Verbatim Reviews: All reviews are routinely sent to the proposer, but without attribution to individual reviewers. Where panels are employed, summaries of their deliberations are also provided.

(3) Formal Reconsideration: At the applicant's request, reconsideration may be carried out by persons not involved in the earlier decision. This is not a "de novo" review of the scientific merits but examination of how the case was handled by the program officer. An applicant not satisfied with the first reconsideration may have his or her institution request a further reconsideration by the Foundation's deputy director.

(4) Sampling: The Director's Office of Audit and Oversight routinely samples actions for compliance with Foundation procedures and provides direct feedback to the program division.

(5) External Peer Oversight: Each program is given a comprehensive review ever three years by a small group of external peers familiar with the field. These "visiting committees" make formal reports to the NSF Director. The reports, and the annual summary, are available to the public.

(6) Analyses of Decision Patterns: The Director's Program Evaluation Staff runs statistical tests to

see how the system has treated various classes of applicants.

(7) Informal Program Checks: Our actions and decisions are meant to be open, above board, and subject to scrutiny from applicants and outside bodies. The Foundation is well respected within the various research and education communities for its tradition of seeking, listening to, and taking action on, input from those we serve.

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QUESTIONS SUBMITTED BY SENATOR WYCHE FOWLER, JR.

MINORITY EDUCATION

SENATOR FOWLER: I know that NSF has recently been working very hard to make up for the lack of scientific educational opportunities for women and minorities, and I want to encourage these efforts, which are crucial not only to ensure a fair and just America but also an America which maintains its competitiveness far into the future.

Specifically, I understand that last year NSF supported the establishment of a Comprehensive Regional Center for Minorities at Clark-Atlanta University in order to improve the science education of minority students. What is the current status of this program?

ANSWER: In FY 1988, a grant of $700,000 was awarded to Clark-Atlanta University to support the first year of a 5-year plan to increase the numbers of minorities in careers in science and technology. It is the intent of the Foundation to support this project for an additional four years. The request for second year support has been received and is expected to be acted upon favorably.

SENATOR FOWLER: How many students is it serving?

ANSWER: 340 students (Grades 3-8) (Saturday Academies); 60 junior high students (summer research and enrichment - commuting); 25 senior high students (summer research - in residence); 50 pre-freshmen in special summer enrichment program prior to university enrollment; and 45 elementary and middle school teachers in workshops.

SENATOR FOWLER: In the opinion of many, expanded facilities would help Clark-Atlanta University to meet their important goals in this area. To what extent has NSF supported facilities improvement for minority science education at Clark-Atlanta University and other schools?

ANSWER: NSF has in place a set of programs designed to improve the research and education capabilities of minority individuals and institutions. These programs provide support to a spectrum of people from pre-college through graduate school and to senior investigators; the programs include:

- Research Assistantships for Minority High School Students (RAMHSS). These assistantships are supplements to ongoing awards, or components of new proposals, to encourage high ability or talented or promising students to further their education in science and engineering by allowing them to enter into a research experience with mentoring by a senior investigator.

- Research Careers for Minority Scholars (RCMS). These awards encourage undergraduate and graduate minority science and engineering students to participate in research as an integral part of their training programs.
- Minority Graduate Fellowships Program. This program provides research and education support for graduate students who are members of ethnic minority groups underrepresented in science and technology.
- Minority Research Initiation (MRI). These awards are designed to strengthen the research capability of principle investigators.
- Research Improvement in Minority Institutions (RIMI). These awards improve the research environments at predominantly minority colleges and universities and other institutions with significant minority enrollments through the support of faculty research, research equipment, and cooperative research projects.
- Minority Research Centers of Excellence (MRCE). This program provides support and incentives for a selected group of minority institutions to design and implement long-range plans to upgrade their research and training capabilities in fields supported by NSF.
- Career Access Opportunities in Science and Technology for Women, Minorities and the Disabled (ACCESS). This program supports two major types of projects: Comprehensive Regional Centers for Minorities and Prototype and Model Projects for Women, Minorities and the Disabled. The program involves systematic approaches to identifying, nurturing, and tracking minority youth through the educational pipeline from the earliest grades through college.

Since FY 1982, NSF has made six awards to Clark-Atlanta, totalling more than $1.8 million under this set of programs. In addition, the Computer and Information Science and Engineering Activity has initiated a Minority Institutional Infrastructure Program designed to improve the computing capabilities as well as the access to supercomputing of minority institutions. Clark-Atlanta was awarded a $50,000 planning grant last year to develop a five-year plan in this particular area.

SENATOR FOWLER: What needs do you foresee in this area?

ANSWER: NSF continues to monitor the effectiveness of its programs, and NSF is taking a particularly keen interest in the spectrum of programs aimed at women, minorities and disabled. NSF is examining its set of minority programs to identify weaknesses, gaps in coverage, etc. As the formal set of programs matures and evolves, continuous evaluation of the effectiveness of the set of programs will be necessary. In particular, NSF programs must:

- help nurture and develop interest in science and engineering at the pre-college level;
- provide a hands-on research experience for undergraduates as part of their formal training;
- support outstanding minority students that select science and engineering fields for graduate study;
- help young minority scientists and engineers develop proposal review and writing skills;
- enable minority scientists and engineers to initiate their research careers and successfully maintain them; and
- assist minority institutions in their development as full participating partners in the Nation's research and education enterprise.

US. ANTARCTIC PROGRAM--GENERAL

SENATOR FOWLER: I want to commend you, Dr. Bloch, on taking the initiative several years ago in commissioning a review board on environment, safety, and health issues surrounding the U.S. presence in Antarctica. I am pleased to see that your budget request this year contains $10 million to begin a five-year initiative that may solve some of these problems.

This five-year program is projected to cost $179 million, and I understand that it will attend to problems in the areas of 1) waste management and disposal; 2) environmental monitoring; 3) air traffic control facilities; 4) improved communications facilities; and 5) accelerated clean-up of existing pollution. Do you have a specific plan for this program, with time-frames, relative priorities, and implementation schedules?

ANSWER: At this time we have a description of the five year program. More detailed implementation plans wait on the appointment of a Safety, Environment and Health Officer in NSF's Division of Polar Programs, an action expected shortly. Some of these plans will also depend on the outcome of environmental studies to be undertaken in the first year of the initiative.

SENATOR FOWLER: Is this available to the subcommittee or to the general public?

ANSWER: The program description has been provided to environmental groups and is reprinted below.

A SPECIAL

SAFETY/ENVIRONMENT/HEALTH INITIATIVE

U.S. ANTARCTIC PROGRAM

The National Science Foundation has proposed a major, multi-year Safety, Environment, and Health initiative. A comprehensive approach to improvements in these areas is necessary in order to deal with the significant problems which have accumulated. The goals of the initiative are:

- Safety: to achieve year-round operations in the Antarctic with modern technology and acceptable risk;
- Environment: to clean up the debris of past operations, and to bring present operations into agreement with current regulations, prevailing attitudes, and current technology;
- Health: to improve medical facilities and to provide field parties with safety experts who have medical training.

This initiative responds to the recommendations in "Safety in Antarctica," the report of a special antarctic safety panel appointed by the NSF Director, and the NSB report "The Role of the National Science Foundation in Polar Regions." While the U.S. Antarctic Program has attempted to deal with problems in these areas in the past, resources have been inadequate, and a number of serious problems exist, including waste disposal, environmental monitoring, communications, and emergency facilities.

The President's FY 1990 Budget Request includes $10 million to start this effort. Over half of this initial increment is for environmental activities, with the balance earmarked for safety- and health-related improvements. The total package is expected to approach $100 million over five years, exclusive of aircraft acquisition. Of this amount, over $30 million will be used to improve environmental protection.

ENVIRONMENT

- Wastewater Treatment and Outfalls. The discharge of raw sewage and other wastewater into the ocean at the McMurdo and Palmer Stations is highly controversial. The Code of Conduct adopted by the Antarctic Treaty parties recommends, at a minimum, that all sewage be macerated and diluted with brine before dispersal. NSF is installing a macerator at McMurdo presently. To achieve maximum dispersion and mixing of the waste in the receiving waters, an engineering report by the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) recommends that NSF also install submerged outfalls. NSF proposes that work to install submerged outfalls at McMurdo and Palmer be accelerated and that an appropriate macerator be placed in operation at Palmer. Comprehensive monitoring of biological, toxic, and other harmful pollutants will be undertaken to determine the impact of wastewater discharges on the local marine environments and on the sea water used to provide fresh water at McMurdo and Palmer, and if additional wastewater treatment is needed.

- Assessment of the Current Solid-Waste System. Effective solid-waste management requires study of McMurdo's, Palmer's, and South Pole's current waste management systems. Study of the systems requires evaluation of solid-waste production, administrative and procedural alternatives, development of information on alternative techniques, and resources for accomplishing desired waste management.

- Development of New Waste-Management System. Development of a new system requires application of a formalized, systems-based approach to waste management. This approach would take account of the entire waste cycle through an input/output modelling effort. Development of this model would take account of pertinent law, public policy, and the entire waste-materials cycle.

- Stabilization and Landscaping of the Former Winter Quarters Bay Dumpsite. This area of McMurdo Station is a continuing focal point for criticism of how the USAP has handled waste disposal in the past. Prior to the late 1970s, waste generated at McMurdo Station was dumped and burned at the Winter Quarters Bay site. Work has continued over several years to remove old wastes from the Winter Quarters Bay Site. This work is both difficult and dangerous, but it has progressed. It is recommended that rather than removing old wastes from the site, that the site be covered with fill. The major rationale for this approach rests on the lack of reliable history of dumping at the site. Thus hazardous wastes that may be buried at the site may be re-mobilized by attempts at total removal from the area. If the site were covered with fill and re-landscaped, the wastes unfortunately deposited there should be immobilized. Cont-inued monitoring, however, will be needed.

- Landscape Rehabilitation at Several Areas at McMurdo Station. These areas have been used for many years as sources of local fill material for construction. Returning them to their original appearance would improve the aesthetic quality of McMurdo and its environs.

- Incinerator at Fortress Rock Landfill. With the 1980-1981 operating season at McMurdo Station, USAP initiated a landfill operation to accompany the burning of combustibles at Fortress Rock. The installation of an incinerator to burn all combustibles, except plastics, at the station appears to be a way of reducing the high volume of wooden and cardboard packing material that comes to McMurdo each year. However, careful study of impact and alternatives is required, as well as appropriate design for any facility to be constructed.

- Palmer Station Waste Management. The size of Palmer Station (5% of that of McMurdo) raises the question of need for an incinerator at that station. The study mentioned above will focus on the situation at McMurdo Station, with further examination of Palmer Station.

- Facilitation of Waste Collection. Waste collection and subsequent handling could be improved at all USAP stations through use of covered dumpsters and trash compactors.

- Clean-up at Abandoned Stations. A project has been under way to clean up old Hallett Station nearly 300 miles north of McMurdo. Similar efforts are required elsewhere.

- Assessment of Wastewater Pits. Snow pits are used for the disposal of wastewater at Williams Field, Amundsen-Scott South Pole Station, and at large field camps on snow.

- Minimization of Use of Plastics. Plastic materials comprise a sizeable fraction of the imports that are incompatible with the antarctic environment. A special effort is needed to disclose ways of replacing plastics, e.g., in packaging, and ensuring that unnecessary plastics already on station are separated, compacted and retrograded.

- Environmental Monitoring Program. Through a workshop, participants in which would include grantees and private sector organizations, the USAP will assess the types of monitoring that would prove beneficial to environmental management at stations, with focus on McMurdo, and then conduct such monitoring in the long-term.

- Fuel Tank Containments. Fuel stored in Antarctica is generally in steel tanks or rubber bladders. This project would provide for construction where needed of protective containment structures of design appropriate to the location.

- Oil/Fuel Spill Cleanup Equipment. The intention is to draw on arctic technology and obtain the necessary equipment and materials to contain and clean up accidental fuel spills both on land and in the harbor at McMurdo and Palmer Stations, and elsewhere.

SAFETY AND HEALTH

- Upgrading of Medical Facilities. The "Safety in Antarctica" report "recommends that medical facilities at South Pole and Palmer Stations, including equipment and medications should be inspected regularly and upgraded." Equipment and facilities are in need of upgrade to provide the recommended increase in on-site capability to handle the range of routine and emergency medical situations that might arise.

- Field Party Communications. Development of improved field party communication systems will involve several technologies depending on distance from McMurdo Station. Meteor-burst communication for remote field parties is being tested. Such a system would serve as a limited alternative to present HF radio communication. However, to provide reliable communications beyond short messages, development of new field party communication systems is needed. To meet long range communication systems needs, plans are to contract for design of such a system.

Meanwhile, plans are to proceed with a relay network in the McMurdo region to improve communications with helicopters and field parties working on the sea ice and in the Dry Valleys. Meteor-burst communications will be implemented if proven effective, and present HF gear will be upgraded.

- Search and Rescue. The effective use of SARSAT/COPAS personal locator beacons (PLBs) will be highly dependent upon the development of satellite distress signal reception at McMurdo Station, coupled with the procurement of an adequate number of the PLBs.

- Fire Suppression and Utility Distribution. All antarctic stations need improved capability to fight serious fires. This project allows the installation of a piped fire main/hydrant system at McMurdo Station, where there is an abundant water source from the sea and potential means to rapidly fill the system for use. The fire mains would be included as part of the consolidated utility distribution system. Hydrants would also be added to existing seawater lines at Palmer Station.

- Back-Up Water Plant. Currently, all potable water at McMurdo Station is produced in one structure. This project would allow rework of the former plant, located some distance away, to provide back-up to the primary plant. It should also provide a source of stored fresh water to aid in the initial rapid filling of the fire mains. In addition, a water usage assessment would be undertaken.

- Emergency Facility at South Pole Station. The South Pole Station needs at all times a readily available refuge for use in case of loss of or major damage to the main station. This facility is vital during the winter, when outside assistance is nonexistent, and its improvement is necessary.

- Upgrading Berthing at South Pole Station. One of the main problems at South Pole Station is the size of the dorm rooms. Also, a large number of people are housed in a very small area making egress difficult. The danger to be occupants in the event of fire is high. Also, the structures have deteriorated because of infiltration and freezing of moisture in their insulation. Rework of buildings is needed to improve habitability and safety pending completion of a new station.

- Specific Cultural and Other Human Needs. These include libraries, recreation and social facilities, interfaith centers, either new or expanded gymnasia, and multi-use spaces for lectures and other community activity.

- Upgrade and Replacement of Quad Radars and TACANS and Minimum Capabilities for Year-Round Access to McMurdo. The outdated quad radars and TACANS at McMurdo and South Pole should be replaced with state-of-the-art equipment to allow reliable air traffic control and precision landings under adverse weather conditions and in the austral winter.

MAJOR SAFETY NEEDS

- Procurement of Aircraft. Prior to the complete loss of one of the five newer LC-130's in the 1987-88 season, USAP plans called for a fleet of eight aircraft of which seven would be capable of deployment to Antarctica and one available for training. The demonstrated need to provide for attrition requires action with respect to new aircraft. The Safety Panel pointed out that new aircraft should enhance rather than duplicate present capabilities. Therefore, the acquisition of two new LC-130's that can be refueled in flight is recommended. These aircraft would increase operational capabilities and safety as described in the Panel's report.

- Ground-Based Transport. Development of a ground transportation system incorporating medium-size air-cushion vehicles (ACVs) is needed for quicker movement of personnel (and cargo) from Williams Field on the Ross Ice shelf to McMurdo. The acquisition would also allow experimental use of the ACVs for field camp support in the McMurdo Sound vicinity. If successful, this would reduce the load on the aging helicopter fleet for field camp support.

- Replacement of South Pole Station. Recent studies by CRREL have identified problems with the integrity of the dome that encloses research facilities at Amundsen-Scott South Pole Station. The station is now 14 years old and serious attention must be given to replacing the dome and the buildings it houses, as well as upgrading the station's power, water, and waste disposal systems. Completion of this work is necessary by the mid-1990's. What is proposed here is design of a new energy-efficient station possibly using solar power that will be needed prior to the end of this century.

INCREASE TO BASE BUDGET

The U.S. Antarctic Program Safety Review Panel Report made several recommendations that would require an increase in the annual operating costs of USAP.

- o Science Field Parties. SFP-1 "the National Science Foundation establish a pool of Field Safety Experts and assign them to support remote field parties."

Implementation of the above and related recommendations is planned for FY 1990.

- o Survival, Search and Rescue. SSR-1 "an expanded U.S. survival training program should be established."

To implement this recommendation, training would be provided to approximately one thousand personnel annually.

- o Clothing. SSR-2 "a process for regular testing and evaluation of new materials and products for clothing and other U.S. Antarctic Program needs be developed and implemented."

This will need to be a continuing effort.

- o Environmental Assessments and Monitoring. In addition to the environmental activities suggested above, continued management, study and monitoring will be required to insure against adverse impacts of program activities.

SENATOR FOWLER: How has this been developed? With whose input?

ANSWER: The program description was developed by NSF staff. It is based on a number of inputs, among which were "Safety in Antarctica" the report of the U.S. Antarctic Safety Review panel, June, 1988; concerns of the National Science Board; program participants and environmental groups.

SENATOR FOWLER: What specifically would this $10 million in FY90 be spent on?

ANSWER: Of the $10 million for FY 1990, a bit over half will be used for environmental activities including several major studies and assessments, rehabilitation of the former dump at Winter Quarters Bay, and measures to facilitate waste collection. The balance will be used for safety and health related efforts including ground-based air traffic control, field party and search and rescue (SAR) communications, and safety upgrades of buildings.

SENATOR FOWLER: What would you do if we on the subcommittee -- facing the unusual constraints we have this year -- could only provide half of that?

ANSWER: If it is necessary to reduce the initial increment of $10 million by half, environmental activities would be reduced to studies, but planned actions to start clean up could not be undertaken. Safety/health activities would be limited to air traffic control and SAR communications equipment acquisition and safety studies only.

U.S. ANTARCTIC PROGRAM -- AIRCRAFT

SENATOR FOWLER: I understand that this $10 million does not include purchase of aircraft. Last year you lost one of your ski-equipped LC-130 planes, and your safety review panel has recommended that NSF acquire two more of these aircraft which can be refueled in flight. How many planes do you have now?

ANSWER: At present, the NSF owns seven LC-130 aircraft, of which one was recovered from Antarctica in December, 1987 and requires significant work prior to deployment.

SENATOR FOWLER: How many do you think you need to ensure the safety and effectiveness of our Antarctic operations?

ANSWER: Seven aircraft deployed to the Antarctic should meet program needs. The two new aircraft recommended by the safety panel would provide additional capability because of airborne refueling. The new aircraft would also allow older aircraft to be used for backup and training and extend the life of the total fleet, which would then consist of nine aircraft.

SENATOR FOWLER: What plans do you have for procuring these aircraft?

ANSWER: The aircraft are included in FY 1993 and FY 1994 in the Safety, Environment and Health Initiative plan, subject to special review.

SENATOR FOWLER: Do you know how much they will cost?

ANSWER: The estimated cost of the two new aircraft recommended by the safety panel is $84 million.

SENATOR FOWLER: Have you asked OMB to approve any such request?

ANSWER: The aircraft were included in our five-year Safety, Environment and Health request to OMB and are included in out-year estimates approved by OMB.

SENATOR FOWLER: I understand it takes about three years to special build one of these planes, and I understand that the present fleet is considered quite aged. What are your plans for dealing with this before it becomes a crisis?

ANSWER: The safety review panel recommended that "the National Science Foundation should begin the process of enhancement or replacement as necessary of the existing fleet of aging LC-130 aircraft. Air refueling capability should be given serious consideration in any such procurement." The existing aircraft are scheduled to undergo significant upgrades, the first starting in October, 1989 and the last in October, 1994 in a program designed by the Naval Air Systems Command. This upgrade program, long-lead-time procurements for which have been underway for several years, and initial plans for new aircraft reflect our efforts to avoid a future aircraft crisis.

U.S. ANTARCTIC PROGRAM -- ENVIRONMENT

SENATOR FOWLER: Dr. Bloch, as you know, the Antarctic environment is an extremely fragile one, and the very success of our research at the South Pole depends on the maintenance of this pristine environment. I have been disturbed to see reports of the damaging effects of American scientists in Antarctica, from water pollution to landfilling of garbage that would be better off carried out like a good backpacker would. Can you please explain how your proposed initiative will address these issues?

ANSWER: The NSF is charged with budgeting for and managing the U.S. Antarctic Program to provide an active and influential presence there. This presence consists of two coastal stations and one at the South Pole. Science is regarded as an expression of this presence. McMurdo Station, in addition to providing a base for research in its general vicinity, is the essential staging base for operation of the U.S. station at the South Pole, where the territorial claims of a half dozen countries that are currently held in abeyance under the Antarctic treaty converge. Given this situation it seems inappropriate to point to U.S.

scientists as the source of whatever pollution the U.S. Antarctic program causes.

Currently our operations at Palmer Station, which has only about 4% of the population of McMurdo and is not a significant staging base, approach the "pack out what you carry in" ideal much more closely than McMurdo operations. In dealing with a station at McMurdo where the population reaches 1,200 in the austral summer, the backpacker analogy appears inappropriate. However, significant progress has been made in recent years in clean up of McMurdo and the retrograde of scrap and solid wastes. Additional steps to be taken have been outlined in an Environmental Protection Agenda for the Antarctic Program prepared by the Foundation staff. The environmental part of the Safety/Environment/Health initiative is intended to build on these efforts.

SENATOR FOWLER: It has been claimed that NSF is operating in an environmentally unsound manner in Antarctica, in violation of the Code of Conduct under the Antarctic Treaty. Is it your opinion that NSF is in compliance today?

ANSWER: During the past year, both the Palmer Station and the South Pole Station were in substantial compliance with the recommended procedures in the Code of Conduct. McMurdo Station, which is unique because of its size and facilities, operates under a 1983 NSF directive that is slightly different from the procedures recommended by the Code of Conduct. Our SEH initiative is designed to meet, and in some cases exceed, the recommended procedures contained in the Code of Conduct.

SENATOR FOWLER: Is the landfill at McMurdo a violation, since it is at a coastal station?

ANSWER: The 1983 NSF directive under which McMurdo Station operates provides for a landfill.

SENATOR FOWLER: Would an incinerator for garbage at McMurdo station be allowed, or would it be better to send everything back where it came from?

ANSWER: Examination of incinerators and landfilling is planned as part of the first stage of the initiative in FY 1990. The volume of wood and paper packaging materials is sufficiently large that shipping them back along with other materials that are returned is a large and costly task. Proper incineration produces no significant pollution, provided no toxic or hazardous wastes are burned.

SENATOR FOWLER: Will this initiative bring NSF into compliance?

ANSWER: During the past year, both the Palmer Station and the South Pole Station were in substantial compliance with the recommended procedures in the Code of Conduct. McMurdo Station, which is unique, operates under an 1983 NSF directive that is slightly different from the procedures recommended by the Code of Conduct. Our SEH initiative is designed to meet, and in some cases exceed, the recommended procedures contained in the Code of Conduct. The ultimate direction of NSF's initiative will be shaped by the availability of funds and several activities scheduled for this year, such as continued pollution abatement efforts at United States Stations, the revision of Code of Conduct for waste handling, a full legal review of NSF's compliance with applicable environmental standards, and a revision of NSF's Environmental Protection Agenda in response to what has been learned through these and other efforts.

SENATOR FOWLER: It has also been suggested by those groups who monitor this sort of thing that NSF's activities in Antarctica are not in compliance with domestic environmental regulations. First, do you think these laws apply to NSF in Antarctica? Whether or not they apply, are you in compliance?

ANSWER: Several sovereign nations claim overlapping portions of Antarctica, though the Antarctic Treaty maintains the status quo. The United States itself makes no claim nor does it recognize those of other nations. Therefore, the possible application of United States domestic environmental regulations in Antarctica raises complex legal and policy issues. The Environmental Protection Agenda calls for a full review by NSF's Office of General Counsel of U.S. Antarctic Program compliance with applicable international and other environmental standards in the Antarctic. That review will be completed shortly. The intent of the SEH initiative is to allow compliance with domestic regulations that embody sound environmental practice, to the extent feasible, even if such laws do not technically apply.

SENATOR FOWLER: To what extent do you consult with the Environmental Protection Agency on these issues? Do you avail yourselves of their considerable expertise?

ANSWER: NSF has attempted in the last few years to expand in-house expertise to handle the environmental issues that it faces. For example, key participants in the development of the Environmental Protection Agenda and the legal compliance review have substantial past experience working with EPA. We intend to draw on EPA's expertise as appropriate in the course of carrying out the SEH initiative.

SENATOR FOWLER: Your environmental initiative offers the promise that it will serve as a model for other nations with Antarctic operations. Do you believe we are a good model now?

ANSWER: We think there is room for improvement, thus the environmental portion of the Safety, Health and Environment Initiative.

SENATOR FOWLER: How do we compare to our colleagues from other nations in Antarctica? Can we learn from them? What can we teach them, as responsible members of the world community?

ANSWER: Palmer Station currently has only about 4% of the population of McMurdo and is not a significant staging base. Almost all foreign stations are closer in size to Palmer than McMurdo thus easing their environmental impact problems and the amount of experience they have which we can draw on.

The initiative, if pursued successfully, can provide examples of how to minimize pollution from antarctic stations.

QUESTIONS SUBMITTED BY SENATOR ALFONSE M. D'AMATO

EARTHQUAKE CENTER

SENATOR D'AMATO: In September 1986, NSF established an earthquake engineering center at SUNY Buffalo. I understand that this center is now undergoing its three year review. How is that review proceeding, and when do you expect to announce the result of that evaluation?

ANSWER: The third year review of the National Center for Earthquake Engineering Research located at SUNY Buffalo is underway. The review is being conducted in two parts: a financial part and a technical part. The site visit by NSF auditors and by an external evaluation team has been completed and their reports are being prepared. NSF plans to announce the results of the evaluation and its actions by mid-August, 1989.

SCIENCE AND TECHNOLOGY CENTERS

SENATOR D'AMATO: Last year you established a new Science and Technology Center at the University of Rochester (The Center for Photoinduced Charge Transfer). I understand there is considerable involvement for such industry leaders as Kodak and Xerox at the Rochester Center. To what extent have the other Science and Technology Centers attracted similar industry involvement?

ANSWER: Each Science and Technology Center (STC) awardee structured its proposal to best suit the needs of the particular Center. Thus, there is variation among the Centers in the amount and type of industrial involvement and contribution involved.

The University of Rochester will participate in joint research activities with both Kodak and Xerox involving both university and industrial participants. The industrial laboratories will be made available to the Center researchers for these purposes. In a similar vein, Rutgers University, collaborating with Princeton University, will have the participation of AT&T scientists in the Center for Discrete Mathematics and Theoretical Computer Science.

SENATOR D'AMATO: Your testimony indicates that industry contributed over $300 million to NSF-sponsored programs in 1988, with roughly $100 million going to centers and group research. Do you anticipate an increase in overall industry contributions in FY90?

ANSWER: There have been direct contributions, both cash and in kind, to a number of Centers from the private sector from such corporations as Amoco, General Electric, General Motors, 3M Corporation, and many more. The total support from all industrial sources comes to over $5M, about one fifth of the total STC Program budget. These figures are the initial state for the STCs, having been reached prior to any awards.

Recently, Cray Computer indicated a willingness to contribute supercomputer time to Centers that require it. While the terms of this agreement are still under negotiation, this contribution represents a significant new involvement, which was not anticipated at the time the first class of awards was made. In most cases, however, it is too soon to attempt to predict the extent of industry support in FY 1990.

SENATOR D'AMATO: What role will the centers play in fostering industry participation in the future?

ANSWER: During the site visits conducted during the review of the Center proposals many industrial representatives were present to support the activities of the Centers. We expect that in many cases this will translate directly into support for the 11 Centers. These industrial linkages will go a long way to shorten the time span between actual discovery and utilization of new knowledge. This rapid transfer of knowledge is critical to our nation's ability to compete in the world market.

NATIONAL SUPERCOMPUTER CENTER

SENATOR D'AMATO: Mr. Bloch, I understand the FY90 budget contains a request for $20 million to renew and upgrade the National Supercomputer Centers.

(a) What is the status of the upgrade competition and when do you and the National Science Board expect to act on the proposals you are considering?

ANSWER: The five NSF Supercomputer Centers have submitted their renewal and upgrade proposals to the NSF in November of 1988. These proposals are currently in the final stages of the technical review process. A recommendation will be made to the National Science Board in May of 1989, and the resulting awards will be made to cover the FY 1990 to 1995 time period.

SENATOR D'AMATO: How many supercomputer Centers do you expect to upgrade in FY90 assuming you get the resources you have requested?

ANSWER: If we get the resources we have requested, we will be able to support the upgrading of four Centers starting in FY90. Then all five will be at the present state of the art. The fifth was recently upgraded and has no additional upgrade need in FY90. This means that we will begin to fund the upgrades that several of the Centers have initiated and for which we presently have no commitment.

SENATOR D'AMATO: Should you not get your full request, how will you determine which Centers are funded in the coming fiscal year?

ANSWER: If the full request is not granted, the results of the review process will be used to guide NSF in deciding which Centers to renew and upgrade and at what funding levels. Technical reviewers gave the highest support to an aggressive upgrade policy to maintain access to the leading edge of the supercomputing capability even if this meant fewer upgrades or Centers. Phase-outs are unwarranted at this time and costly, and are not something we would choose to do unless funding constraints leave us no choice.

QUESTIONS SUBMITTED BY SENATOR PATRICK J. LEAHY

ARCTIC SOCIAL SCIENCES

SENATOR LEAHY: Report language included in the FY 1989 appropriations law covering the National Science Foundation directs the NSF to initiate a vigorous program of Arctic social science research as mandated under the Arctic Research and Policy Act of 1984.

What action is the NSF pursuing in response to this directive, and will you meet the time frame set by the Congress, calling for the development of a detailed plan of action by the end of FY 1989?

ANSWER: The recent National Academy of Sciences' report "Arctic Social Science: An Agenda for Action" and its recommendations were discussed at the March 27, 1989, Interagency Arctic Research Policy Committee (IARPC) meeting. The agencies were asked to submit written responses to the report within 30 days.

The Arctic Research Commission was briefed on March 28, 1989, on the status of NSF and IARPC response to the report.

A consolidated NSF and interagency position on the Arctic Social Sciences will be presented in the first biennial revision to the U.S. Arctic Research Plan, due to be submitted to the President by July 1989. Detailed NSF plans will follow and be available by the end of FY 1989.

SENATOR LEAHY: Have you seen the March 16 letter on Arctic social sciences from Senator Murkowski and me, and does the NSF intend to follow the course of action that we suggest in the letter? Thank you for your replies.

ANSWER: The response to the letter from you and Senator Murkowski, is along the lines indicated above.

QUESTIONS SUBMITTED BY SENATOR PETE V. DOMENICI

GLOBAL CLIMATE CHANGE - NATIONAL SCIENCE FOUNDATION

SENATOR DOMENICI: I am pleased to see the President make a commitment to increase research into global climate change in his FY 1990 budget request. As the attached chart shows, the budget request totals $190.5 million for seven federal departments and agencies to address the phenomenon known as global change. The request represents a $56.6 million, or 42 percent, increase over the FY 1989 funding level for such activities. Support for this request will allow us to proceed with the initial research program outline in "Our Changing Planet: A U.S. Strategy for Global Change Research, " which accompanied the budget request.

Table 1 on pages 24 and 25 of the "Changing Planet" report outlines the proposed global change budget program by agency and science element.

Would you please provide for the record a detailed breakdown, by program, account, and amount that these funds would be used for, if appropriated?

ANSWER: The National Science Foundation FY 1990 request for the Global Change Research Program is $53.5 million. The following table provides a breakdown by program, account, and amount.

FY 1990 NSF GLOBAL CHANGE RESEARCH

Research & Related Activities.......	$46.2 million	
Global Tropospheric Chemistry	$ 7.8 million	
Global Flux Study		7.2
Global Ocean Ecosystem Dynamics		0.4
World Ocean Circulation Experiment		8.1
Tropical Ocean/Global Atmosphere		7.4
Solid Earth Geodynamics		4.8
Ridge Inter-Disciplinary Global Experiment		1.7
Coupled Energetics & Dynamics of Atmospheric Regions		2.6
Arctic Systems Science		5.5
Changes in Earth History		0.7

US Antarctic Program.................	$7.3 million
Stratospheric Ozone..................	$ 5.8 million
Long-term Ecological Sites	1.5

SENATOR DOMENICI: Would you also provide a brief summary of the questions the research supported in this initiative would address, and how it would advance our understanding of the potential impacts of global change?

ANSWER: The goal of the U.S. Global Change Research Program is to establish the scientific basis for national and international policymaking related to natural and human-induced changes in the global earth system. This will require addressing three major questions: (1) What global change has occurred in the past and is occurring now? (2) What physical, chemical, and biological processes, including those associated with human activities, are involved in regulating global change and its environmental impacts? (3) How well can global change and its impacts be predicted?

Research in Global Tropospheric Chemistry will improve our understanding of the processes controlling atmospheric composition and the ability to predict atmospheric chemistry changes and the resulting influences on the climate system. Global Ocean Flux Studies will develop a predictive ability to understand the effects of global scale perturbations on the oceans' role in the flux of important biologically active chemical elements and the role these oceanic processes play in global change issues. Stratospheric Ozone studies will lead to improved predictive capabilities for stratospheric chemistry and the biological significance of increased ultraviolet radiation in the polar regions.

Research on Global Ocean Ecosystems will lead to understanding the response of marine plant and animal populations to environmentally driven changes in ocean circulation and chemistry induced by greenhouse warming and pollutants, and is expected to allow improved prediction of the consequences of global sea level rise on such systems.

The World Ocean Circulation Experiment is expected to lead to improved models of atmosphere-oceanic coupling that can be used for climate simulation and prediction; and the goal of the Tropical Ocean Global Atmosphere program is to develop and evaluate predictive models of this system for time scales of months to years.

Arctic Systems Science will provide information for defining and understanding how climate has varied in the past and determining how well the historical record can be explained and used for understanding future changes in the climate system. Solid Earth Process studies will provide data on active changes for processes that control erosion through the continental hydrologic process, coastal flooding through sea level changes and earthquakes that result through crustal strain and subsequent deformation.

Studies of oceanic ridges provide understanding of the physical, chemical, and biological causes and consequences of the energy transfer within the global mid-ocean ridge system; and Coupled Energetic and Dynamics of Atmospheric Regions (CEDAR) is expected to produce improved models of the coupling of solar energy into the upper atmosphere and how this in turn influences the global climate system.

SENATOR DOMENICI: How does your department/agency propose to coordinate its research efforts under this strategy with the ongoing work of the other federal entities involved in this initiative?

ANSWER: The Committee on Earth Sciences (CES), a Committee of the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET), is the principal interagency vehicle for the planning and coordination of the U.S. Global Change Research Program. The National Science Foundation and the other CES members have developed and approved agency research role statements for all the participating agencies and bodies. The CES is preparing a document for an initial Research Plan for the U.S. Global Change Research Program. Its purpose is to facilitate the planning and coordination of the Federal research and budgetary activities of the Program. This Research Plan will outline the key questions, the research needs, and the priorities involved. It will aid the coordination of research efforts of agency programs (1) that comprise the U. S. Global Change Program, (2) that are closely linked and are complementary to each other, and (3) that have a common intellectual framework and goal.

QUESTIONS SUBMITTED BY SENATOR ROBERT C. BYRD

ASTRONOMY

SENATOR BYRD: As you know, in November of last year, the 300-foot telescope at the radio astronomy observatory in Green Bank, West Virginia, collapsed. What has happened since the collapse?

ANSWER: The National Science Foundation and Associated Universities, Inc. (the organization which operates the National Radio Astronomy Observatory) convened a panel to investigate the most likely cause of the collapse of the 300-foot telescope. The panel concluded that fracture of a particular plate was the most probable cause of the telescope collapse. From a review of Observatory records, the failure of the telescope structure was not a result of inadequate maintenance or inappropriate operation of the telescope. The analyses used in the study were not available at the time the telescope was designed. The National Radio Astronomy Observatory and the affected communities are currently studying what action should be taken.

SENATOR BYRD: I understand that the National Radio Astronomy Observatory (NRAO) manages the radio astronomy observatory at Green Bank for the Foundation. Have you had any discussions with NRAO on a replacement telescope?

ANSWER: The National Science Foundation has met on several occasions with NRAO to discuss options for replacing the collapsed 300-foot telescope with a modern instrument that would serve scientific needs.

SENATOR BYRD: What is the substance of those discussions?

ANSWER: A very general conceptual approach for a replacement instrument has been communicated by NRAO, but no formal proposal for construction of a specific instrument has been submitted.

SENATOR BYRD: What is the scientific merit of a replacement instrument and what sort of priority does the radio astronomy community attach to this replacement telescope?

ANSWER: The contemplated telescope would have important applications to nearly all areas of radio astronomy. The telescope will make major contributions to the study of the structure of the Universe, the gaseous content of galaxies, solar/stellar phenomena, molecular clouds and star formation, evolution of galaxies, the solar system, and the nature of radio galaxies and quasars. The community attaches great importance to maintaining the scientific capabilities the United States had with the 300-foot antenna.

SENATOR BYRD: What would you estimate a replacement telescope to cost and when would it be operational?

ANSWER: This will depend on what the specific requirements of such an instrument would be.

SENATOR BYRD: As you noted earlier, Green Bank is a federally owned facility dedicated to radio astronomy and is situated in a radio free zone that is unique from anything else in the world. Moreover, the loss of the telescope was clearly an unanticipated disaster. As such, given the timing, the Fiscal Year 1990 budget does not include any funds to respond to this disaster. To your knowledge, has the Foundation ever faced a comparable situation previously?

ANSWER: No.

EXECUTIVE OFFICE OF THE PRESIDENT

Office of Science and Technology Policy

STATEMENT OF WILLIAM R. GRAHAM, SCIENCE ADVISOR TO THE PRESIDENT, AND DIRECTOR

ACCOMPANIED BY:
- ROBERT L. POST, JR., EXECUTIVE DIRECTOR AND SPECIAL ASSISTANT TO THE SCIENCE ADVISER
- THOMAS P. RONA, ASSOCIATE DIRECTOR AND DEPUTY
- BEVERLY BERGER, ASSISTANT DIRECTOR FOR LIFE SCIENCES
- LT. COL. JOHN O'NEIL, ACTING ASSISTANT DIRECTOR FOR NATIONAL SECURITY

BUDGET REQUEST

Senator **Mikulski**. Next the subcommittee would like to welcome Dr. William Graham, the Director of the Office of Science and Technology Policy, and the Acting Science Adviser to the President.

The Reagan and the Bush administrations have both requested a 28-percent increase for the Science Adviser's Office, but would give the Office a total budget of about $2 million. It's my hope that we can discuss not only this proposed increase but, more importantly, the responsibilities of this Office in coordinating our country's civilian research.

We have, as you know, received a paper from the National Academy of Sciences talking about what they think the Science and Technology Adviser should be at the White House.

I am anxious to work with the President and his Science Adviser to forge a consensus on science funding priorities, particularly in light of President Bush's pledge to elevate the Office of the Science Adviser in the White House hierarchy.

Dr. Graham, we look forward to your comments and sharing your experience, not only sharing with us what you've done, but what you think the future of the Office could hold now that you've been inside. We look forward to your testimony and the comments of the other people you have with you. If you would care to introduce them, we would be delighted to get to know them better.

Dr. **Graham**. Thank you, Madam Chair.

INTRODUCION OF ASSOCIATES

I might introduce my colleagues.

On my far left is Dr. Tom Rona, the Associate Director of the Office who also functions as my Deputy; next to me is Dr. Robert Post, who is the Executive Director of the Office; at my right is Dr. Beverly Berger, who is the Assistant Director for Life Sciences; and at her right is Colonel John O'Neil, who is the Acting Assistant Director for National Security.

Madam Chair, if I might proceed with a summary of my testimony.

SCIENCE AND TECHNOLOGY POLICY

Senator **Mikulski**. Please do.

Dr. **Graham**. Thank you.

I appreciate the opportunity to speak to you about the budgetary needs for the Office of Science and Technology Policy, but before doing that, I would like to make a few comments about science and technology policy in the Bush administration.

This policy was laid out in summary form in the document "Building A Better America," which accompanied the President's Message to Congress on February 9. The administration believes that our economic health and national security increasingly depends on our advances in science and technology.

Of course, it's the responsibility of the administration to propose to Congress the hard choices and the specific prioritizations of the budget each year, not only internal to the scientific issues, but between the scientific issues and all the other sectors of the Federal budget.

A version of that of course was sent forward by President Reagan, and now the issues related to that are being discussed by the administration with Mr. Darman taking the lead with the Budget Committees and other committees in Congress.

THREE BROAD DIVISIONS OF REVIEW

Overall we review the research activities in at least three broad divisions.

The basic activity is done on a principal investigator relatively small-scale level, much of which is done in the university and much of which focuses on basic research.

As you find the projects becoming somewhat larger going from the hundreds of thousands of dollars to the million dollar range at these principal investigator grant-level efforts to more of a group or association level, they become characterized by such things as the engineering research centers, the science and technology centers, the pilot centers of the Department of Energy for superconductivity, and other types of topically focused, but in many cases interdisciplinary activities.

Then, finally, when the scale becomes large enough, we go to the major initiatives, major scientific individual initiatives that the administration proposes.

The way we determine which of these to support at each level depends somewhat on the size of the activity. We attempt to run a merit review process using as much initiative at the principal investigator level as possible for the smallest scale activities.

At the intermediate scale we engage certainly the initiative of the communities involved and also try to focus the general topical areas by the choice of the agencies carrying out the work.

And, finally, at the very largest scales the projects require careful, not just interdisciplinary review and discussion and not just interagency review and discussion, but interagency approval, and the largest ones, such as the space station, Superconducting Super Collider, go to the President for his final decision on how to proceed.

I have provided a listing of the larger programs and we can go over those if you wish, but I'll leave them in the document subject to your questions.

SCIENCE ADVISER

First, let me say that the proposal made by President Bush to make the Science Adviser the Assistant to the President for Science and Technology I think is a very sound proposal. It will, of course, leave the Science Adviser in a somewhat dual-hatted position, which he is in today, or which I am in today, which is on the one hand the Director of the Office of Science and Technology Policy confirmed by the Senate to that position and certainly answerable to you and your colleagues, and the other would be as an Assistant to the President as a member of the personal staff, and today I have that position as the Science Adviser to the President.

The person is individually named to the Office by the President and it is unique in the White House structure. Assistant to the President for Science and Technology fits into an existing hierarchy in the White House and is probably a little bit more comprehensible to my colleagues and associates in the Government.

The other issues that the President has stated as his intentions, such as making the Science Adviser or the Assistant to the President for Science and Technology a member of the Economic Policy Council and Domestic Policy Council and presumably Adviser to the National Security Council, which the statute for the Office provides, I think is a very good measure and, in fact, institutionalizes the process that I have been taking part in and conducting in the 2½ years I have been there, but on an ad hoc basis, and I think it's well justified to be institutionalized.

Then, finally, the President has indicated that he intends to have a more direct role with the advisory apparatus to himself and to the Office of Science and Technology Policy that is now done at the most direct level by the White House Science Council, and I believe the President intends to make some modifications in that structure, but to leave the general intent of providing high-level advice.

WHITE HOUSE SCIENCE COUNCIL

Senator **MIKULSKI**. Excuse me, the White House Science Council, and I don't want to derail your thinking, is that made up of agencies or is this made up of scientists?

Dr. **GRAHAM**. It's scientists and engineers, none of whom are part of the Government. They are from the private sector.

Senator **MIKULSKI**. I see, like the National Security Council is made up of people within the Government who must coordinate policy for the President. That's the National Security Council.

Dr. **GRAHAM**. Yes.

Senator **MIKULSKI**. Yours is more along the model of the Council on Economic Advisers.

Dr. **Graham**. Although even that Council, or the members of that Council are, in fact, I believe, confirmed by the Senate and they are full-time Government employees.

This is more along the lines, to give a parallel, say the National Science Board which oversees the activities of the National Science Foundation or the Defense Science Board which provides advice to the Secretary of Defense.

Senator **Mikulski**. These are essentially citizen volunteers who are extremely competent, knowledgeable, and distinguished in their field to which he would turn to advice and consultation?

Dr. **Graham**. Exactly, and they come from the academic sector, from the private sector, from foundations and some formerly associated with Government laboratories, but none actively associated with the Government in that sense today. And that White House Science Council has been serving I believe with distinction through the last 8 years and apparently has impressed President Bush to the extent that he wants to not only continue but strengthen its role and give it a more direct association with him.

In fact, the White House Science Council did from time to time meet with President Reagan, and I think President Bush intends to institutionalize that further.

Before I get to the OSTP budget, I would like to mention one or two other aspects of the Office.

The legislation which establishes OSTP makes its Director, myself, the Chairman of the Federal Coordinating Council on Science, Engineering, and Technology, which is known in the jargon as the "FCCSET." [Laughter.]

It's a challenging name to say the least. This is the committee that is charged with coordinating on an interagency basis the activities of the various branches and offices of the Government in science and technology and has the senior scientific or technological leader of each of the agencies on it. For example, Mr. Bloch, who was here a few minutes ago, is a member of the FCCSET. Mr. Fletcher of NASA is a member. And when you get to other agencies which have a broader charter than just scientific and technological activities, then their senior scientist or technological member of their leadership is on the FCCSET.

The FCCSET, in turn, has established a number of committees, and these change from time to time, depending on the requirements. Some of the most active ones today are the Committee on Earth Sciences.

FCCSET

Senator **Mikulski**. We saw your pamphlet that was produced.

Dr. **Graham**. Yes, that was done by that committee, and it's chaired at the moment by Dr. Dallas Peck who is the Director of the U.S. Geological Survey and who has done an excellent job as the head of that committee of the FCCSET over the last couple of years.

We have, just to mention another one, a Committee on Life Sciences and a Biological Sciences Coordinating Committee which have complementary roles, the BSCC, particularly involving the oversight of the Government's approach to the regulation of biotechnology and genetic engineering in particular, and the Committee on Life Sciences having a complementary policy role and a broader purview over health and life sciences issues. Dr. Berger is the Chairman of the Committee on Life Sciences, and Dr. Jim Wyngaarden, who is the Director of the National Institutes of Health, is the Chairman of the BSCC.

We have a Committee on Materials that does work in superconductivity and other materials issues, a Committee on High Performance Computing and quite a number of others. They report to the FCCSET and to me in that order and that work is then provided to various individuals and positions within the administration, depending on the specific requirements, and of course, as you saw in that report on climate change, it's provided to the Congress as well.

Providing coordination among the agencies is certainly a challenging job, and one which I think has been taken forward during the last several years, but has still a great deal of potential. You mentioned things that might be done in the future, and it seems to me this is a particularly strong one.

We spend about $65 billion a year on research and development in the Federal Government, and about two-thirds of that is spent on defense research and development with the emphasis being on the "D," the development work. It pays for the development of specific military systems, something that we don't know how to get from a more commercially oriented enterprise at this point because the Defense Department is the only customer and they develop the specifications and needs and then develop the equipment itself and put it into manufacture. Needless to say, we are trying to draw on the commercial sector as much as possible for that, but there are still limitations on how far we have been able to go.

I believe there is a great deal of potential and a strong need for further coordination among the agencies on identifying the commercial potential on all the Government research and development, all $65 billion worth of it. Certainly the defense part is a major component, but the part being done for other Departments, Energy, Commerce, Interior, and so on as well.

We have had the luxury of living in the last several decades in an era where we have been largely unchallenged in our technological and industrial superiority, but in the last decade or decade and a half that has changed and the need to make efficient and rapid use of our entire technological capability has become a more and more pressing imperative on the U.S.

However, we developed habits as a government during that time in which we could compartmentalize activities, this is only defense, this is primarily space, this is only Department of the Interior work and this is Energy, and didn't have to look at the broader potential applications of the technologies that were being produced.

On some occasions we did very well. For example, one of our aircraft manufacturers found itself in the jet bomber business soon after World War II. And after building a couple of very successful job bombers they had to build a tanker to fuel them. And after looking at that for a bit it became clear that that could be the basis of a potentially successful transport, and with a certain amount of modification converted it into the 707 aircraft which was enormously successful and which led to a series of other commercial aircraft, and, in fact, today has led to for the United States something like a $75 billion backlog in orders for commercial aircraft and an $18 billion a year trade surplus in almost the only area of high technology that we have a trade surplus today.

If that can happen without a lot of thought being applied to the process by the Government, but with certainly industry willing to take chances—and Boeing played "bet your company" when they built the 707, and they also bet the company when they built the 747 and several other of the aircraft they made—perhaps we can help engender both a willingness to take a risk if the reward is sufficiently great by industry and a willingness of Government to make the things it's doing for fundamentally Government purposes available and as applicable to commercial activities as possible.

I think that can be done in many cases actually at a net saving to the Government and could be done in a very broad range of cases and at a very small cost to the Government. One other item in that, of course, is the Government providing a stable customer base for some particular high-tech items that would be produced.

That has happened in the supercomputer area. Cray Computer is the world's most successful supercomputer building today. Literally their fate hinged on one order from the Los Alamos National Laboratory about 12 years ago, and there were forces trying to dissuade Los Alamos from making that order and to pursue a different course. Since that time the Government has provided a base of customers for the supercomputing industry and we have had a very successful industry in that area.

Senator **Mikulski**. Doctor, we are going to have to move on, although your testimony is actually quite fascinating because I agree with it.

Dr. **Graham**. Let me then leave that subject as an answer to your question of potential challenge.

BUDGET REQUEST

Senator **Mikulski**. You have about 3 to 5 minutes to wrap up. Usually you're allowed 10 and you're now 25.

Dr. **Graham**. Good heavens. All right. Well, let me turn to OSTP and just say that our budget request was $2,027,000 for fiscal year 1990. This is a substantial increase in percentage over this year. This year has been quite low, unprecedented in the history of the Office, and next year we will still be very modest in terms of the history of the Office. We have a large number of responsibilities that we have listed in the document that we provided to you, and we would like to solicit your support in that budget.

I would be glad to answer any questions you may have.

[The statement follows:]

OPENING REMARKS OF DR. WILLIAM R. GRAHAM SCIENCE ADVISER TO THE PRESIDENT AND DIRECTOR, OFFICE OF SCIENCE AND TECHNOLOGY POLICY

I appreciate this opportunity to speak about the budgetary needs of the Office of Science and Technology Policy with you. Before doing that, however, I would like to comment on the science and technology policy of the Bush Administration. This policy was laid out in summary form in "Building a Better America", which accompanied the President's message to Congress on February 9. This Administration believes that our economic health and national security increasingly depend on our advances in science and technology.

The R&D policy of President Bush continues to emphasize the importance of basic research, recognizing its pivotal contribution to our industrial and economic strength. Our top priority is support for basic research. To that end, the Bush Administration has offered a number of initiatives designed to further increase funding for basic research. This includes adequate funding for operations, maintenance and equipment for the existing R&D complex. It is difficult to overestimate the importance of basic research because the leverage is so great. Basic research represents one of the best investments of capital and human resources we can make for the future.

Basic research, to be sure, leads over the long term to improved products -- doing things faster and cheaper. The real argument for basic research, however, is that it it leads to the ability to do new things that previously were impossible at any price. Examples such as the transistor, the laser, fiber optics, and biomedical technology come easily to mind, but this is just the tip of the iceberg. While the days of Lewis and Clark are long gone, the spirit of the explorer is still with us. The present frontier, that of knowledge and the universe about us, is one that will never end.

To take advantage of new research opportunities, we must provide researchers with modern equipment, and adequately support the training of the next generation of scientists and engineers, whose careers will continue well into the next century. Modern research requires increasing levels of capitalization per investigator. Accordingly, we cannot just maintain a constant level of real dollars for the funding of the R&D base in the future, and expect to provide a stable environment for basic and applied research. The proposed doubling of the budget of the National Science Foundation, for example, supports all of these objectives.

A second general science policy objective of the Bush Administration is to identify broad areas of research with particular promise for the future, and assure that sufficient planning and support is provided. Space science, biomedical research, and research concerning the Earth and its environment are important examples of areas of high priority in this Administration:

-- Space science research employing unmanned probes, satellites, and Earth-based facilities, provides a window to the larger world of space. The history of science shows that major scientific advances have repeatedly been triggered by new information from our observations of the universe. We see no reason why this will not prove equally true in the future. Planned missions such as the Hubble Space Telescope will provide order-of-magnitude increases in the resolution of faint light signals, and will probe to the edge of the visible universe. The proposed Comet Rendezvous Asteroid Flyby (CRAF) and Cassini missions, gaining information closer to home, will rendezvous with a comet and survey Saturn and its moons. The Cassini mission in particular will probe the thick atmosphere of Titan, Saturn's largest moon. This information may increase our understanding of conditions in the early solar system.

-- Galileo Mission. In October 1989 NASA plans to launch an exploratory mission to the Planet Jupiter. The space vehicle will fly a trajectory exploiting the gravity assist of Venus and Earth; it will conduct nearby observations of Jupiter and send a probe to explore the Jovian atmosphere. The mission completion is scheduled for summer 1995.

-- NASP. Following President Reagan's announcement in the State of the Union address of 1986, the technology development of the National Aerospace Plane is under way. It is aimed at technology demonstration vehicles in 1996-1996 for sustained hypersonic flight and for single-stage to space orbit. Advancements in this field should lead to retaining international leadership in the aerospace sector, the largest industrial contributor to the nation's exports.

-- Biomedical research includes research to control and eliminate diseases, research on the Human Immunodeficiency Virus, and research to obtain a better understanding of the fundamental processes of life. A good example of the latter is the human genome project. This multi-year effort will result in a complete map of human DNA -- the molecules of heredity. Under this effort, more efficient technologies are also being explored for accomplishing this molecular mapping and sequencing. The success of such technology should greatly decrease the required time and cost for this decoding of DNA. The knowledge of the human genome will have a substantial long-term impact on efforts to understand, and perhaps ultimately cure, genetically caused diseases. Rapid and inexpensive sequencing of DNA would increase the general rate of progress of research in biotechnology.

-- R&D addressing the Earth and its environment is growing in importance. One notable example is research to better understand the basic mechanisms of global change. This includes phenomena such as ozone concentration and the effect of increased carbon dioxide in the atmosphere. At present, computer modeling of long-term climatic change, particularly in response to the buildup in the atmosphere of carbon dioxide and ozone-depleting chemicals, is still in its infancy. Such modeling requires detailed data that can be obtained only from wide-ranging experiments and observations of the Earth's atmosphere, forests, and oceans. This multi-year program has the goal of maximizing our scientific understanding of the environment, so that policies can be based on sound, scientific foundations.

President Bush also is supporting the construction and operation of two major R&D facilities. These proposed facilities are:

-- The Space Station Freedom. Our exploration of the universe cannot be done exclusively by unmanned probes. Future manned exploration of the solar-system first requires a permanent manned base in Earth orbit. The exploration of space must be a multinational effort -- an area of peaceful and productive international cooperation. Space Station Freedom will be a U.S. facility in cooperation with our partners in Europe, Canada, and Japan. It will further international cooperation in space, provide a platform for commercial and scientific enterprise, and ensure U.S. leadership in this truly endless frontier.

-- The Superconducting Super Collider. This facility will explore the structure of matter under conditions similar to those at the earliest stages of the universe. Like the Space Station Freedom, this facility will be funded internationally, and will be used by scientists from many nations. The construction of this facility assumes that one-third of the funding will come from international and other non-federal sources. Not only will this facility attract the international community of scientists; it will also provide training for graduate students in more than one hundred universities across the nation. The SSC will provide a visible inspiration for our young people to pursue careers in science and technology, thus benefiting the entire nation.

Several areas of federally supported R&D are conducted in a number of agencies. In recent years, there has been increasing recognition of the need to treat these efforts in a somewhat more integrated fashion, to assure a maximum impact. In addition to research on global climate change, OSTP is currently coordinating an interagency effort with planned input from the private sector, to develop a plan to maintain U.S. leadership in high performance computing.

In recent years, there has been a tendency to view defense and civilian R&D as a monolithic R&D entity, as if tradeoffs of dollars and people between the two areas could readily be made. In reality, the two areas are very different. Nearly all of Defense R&D (about 92 percent) is in the category of development -- basically development of specific new weapons systems, in response to specific Defense plans. Even in the research funding category, defense research programs are generally closely tied to specific military programs and requirements. Civilian R&D, on the other hand, is concerned with increasing fundamental knowledge of the physical world, and applied knowledge of processes and products with potential uses in the commercial world. As a result, each category of R&D, defense and civilian, must be judged on its separate merits, and in the context of the very different purposes they serve.

I would now like to discuss the OSTP budget request. We are requesting $2,027,000 for fiscal year 1990. This represents a $440,000 increase, or 28 percent, from the 1989 level of $,1587,000, and about the same level of real funding as the 1988 appropriation of

$1,888,000. This requested funding is consistent with the existing ceiling of 15 permanent staff (including secretarial and administrative support).

The request includes $130,000 for anticipated increased travel in support of international science and technology agreements, and in support of the newly formed National Advisory Committee on Semiconductors.

The requested funding, while above the current 1989 level, is still austere relative to most previous years. This can readily be seen from Figure 1, which shows the OSTP funding history in constant dollars.

OSTP currently has six non-administrative science and technology technical staff members (all detailees) to handle the growing workload. This workload involves such activities as:

-- Writing and reviewing Congressional testimony and other communications with Congress.

-- Preparation of a five-year National Action Plan for research in superconductivity, due in August 1989. Coordination with the newly chartered National Commission on Superconductivity.

-- Support for the National Commission on Superconductivity.

-- Coordination and delivery to the President each year of the Title V - Science, Technology, and American Diplomacy report to the President.

-- Coordination of cooperative projects under the provisions of the U.S.-Japan Science and Technology Agreement using the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET) Committee on Materials (COMAT).

-- Staff support for the National Advisory Committee on Semiconductors (NACS).

-- Coordination with other agencies and with the private sector on U.S. approaches for improving our global competitiveness.

-- Coordination with OMB on R&D budgeting.

These examples do not include one of the most important continuing responsibilities of OSTP -- namely anticipating issues in science and technology, both domestic and international, and catalyzing appropriate action.

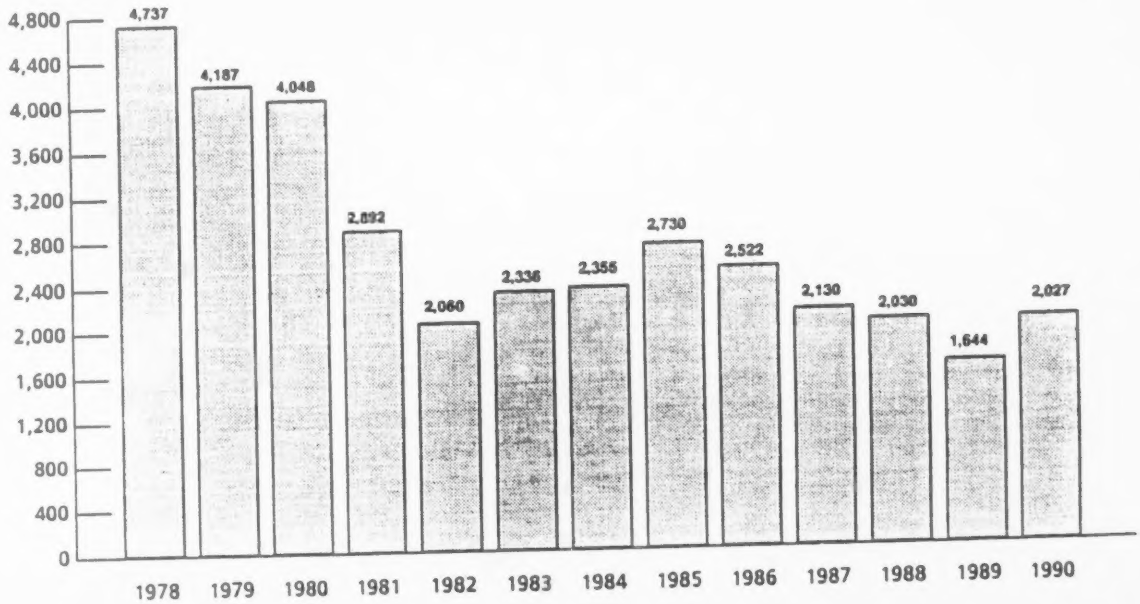
OSTP, because of its position in the Executive Office of the President, ultimately bears much of the responsibility for the overall science and technology policy of this Administration. The most essential institutional role of OSTP is to coordinate science and technology policy among agencies, universities and the private sector. Most of this essential coordination cannot be delegated outside OSTP and the Executive Office, and still serve the President and the future economic needs of this nation with maximum effectiveness. The requested level of funding, while representing a real increase over

1989, reflects the overall constraints on the federal budget. The OSTP request is still austere when compared with the continually growing workload. Accordingly, I am strongly requesting that the request for OSTP be supported in full.

Executive Office of the President
Office of Science and Technology Policy

HISTORICAL SUMMARY OF APPROPRIATIONS

In Constant Dollars
Fiscal Years 1978 - 1990
(IN THOUSANDS OF DOLLARS)



BUDGET INCREASE

Senator **Mikulski**. Thank you, Doctor.

First, thank you very much for an excellent testimony and overview of the Science Adviser's Office, and particularly your comments on R&D, the civilian as well as the military research.

As I understand from your $2 million budget, you want to go up 28 percent. Could you tell us the point of the 28 percent request? Is that going to be used in personnel or what will you use the 28 percent increase for?

Dr. **Graham**. It, in fact, is being spread over the budget. There will be an increase in personnel, some increase in travel and other support functions for the office.

Senator **Mikulski**. It's essentially going to be in travel for these new international agreements that you've been active in formulating?

Dr. **Graham**. Yes. That is the major demand on travel accounts.

Senator **Mikulski**. And also to enable your staff to travel to some of these international meetings on the environment and things like that?

Dr. **Graham**. Exactly.

Dr. **Post**. That's what the increase is for primarily.

SCIENCE ADVISER

Senator **Mikulski**. OK. Now I would like to come, if I could, back to some of the policy questions.

First, we will talk a little bit about the role. I'm concerned that President Bush hasn't appointed a new Science Adviser, not that we want to necessarily get rid of you, Dr. Graham, but if a new administration says it's going to have new people, we regard your post as one of the most important in the Government because you are meant to be the strategic adviser to the President and then really to us in terms of national priorities.

Right now there are so many projects out there to be funded, superconductors, super colliders, the space station, the mapping of the genetic code and our whole effort that I know Dr. Berger is involved with, which is observing ourselves as if we were a distant planet which offers untold opportunities for not only research but also in formulating the policies, global warming, the greenhouse effect, et cetera.

I happen to feel that your position is as important as the National Security Adviser because this is our future. This is our future, and our political might has always rested on our economic power. We won World War II because of the enormous resources we could marshal, fire power by attrition I believe is the doctrine, and we overwhelmed the world then with our goods and services in a good sense, and we want to keep on doing it.

So having said that, where are we with the new Science Adviser?

Dr. **Graham**. Well, we are making progress in that. The President is obviously proceeding very carefully to find a Science Adviser that serves his purposes and can work with his administration very effectively. At the same time, this was a friendly transition in the administration and I've worked with President Bush as Vice President as well as President for 2½ years. He knows me and I think has me well calibrated in the system, and I am working as the Science Adviser today. So there is no discontinuity or loss of the role of the office in that regard, and in due course there will be again a friendly transition to the new Science Adviser.

Senator MIKULSKI. Do you have a sense of timing on the new one?

Dr. GRAHAM. As they say, at the pleasure of the President.

Senator MIKULSKI. I see.

Dr. GRAHAM. I find it dangerous to presume on that, but I would think it would be, or at least the Science Adviser would be named in the not too distant future. The clearance process, as you know, has become laborious. So I wouldn't try to speculate on that.

SCIENCE ADVICE

Senator MIKULSKI. I'm sure you have read the National Academy of Sciences' paper on Science and Technology Advice to the White House, and whether it's you or a friendly successor, and I'm sure you have been in consultation with the President, Mr. Sununu and other top-level people at the White house, but what do you envision as the role of the Science Adviser and his or her office for the first term of the Bush administration and how does it compare to some of the thoughts in the report?

Dr. GRAHAM. The person whose view ultimately wins the day on this is the President's. It's the role he wishes it to have. I believe that that role will, of course, be consistent with the statute that guides the Office and beyond that be an organization that can reach out to a range of individuals and organizations in the academic community, the business community, and the Government coordination process and make sure that the coordination and interagency role that OSTP has been playing in the last several years is further strengthened and elaborated.

Senator MIKULSKI. Well, let me just say what I see the role as being, and, of course, it is the President's decision, but one is that the Science Adviser be the strategic adviser to the President. We have so many outstanding ideas that could be funded. I don't believe we can do them all. I believe that we can do many of them and that they have to be established in a priority that is a national goal and not only a scientific goal. Each one is of enormous scientific merit and that's beyond dispute or debate in scientific merit, but then what is in our economic and political strategic interest, which is both in terms of research, then the development and then the commercialization. That to me is a role for the Science Adviser.

The second would be, of course, the very important role of coordination, and in terms of the coordination it's not only with agencies to make sure they're talking to each other like the excellent report that you've done on global warming. I'm going to a dinner tonight where I'll hear Sir Crispin speak, the UN Ambassador on these topics. I read that pamphlet last night and I thought it was great. So when I'm there listen to what he has got to say, I'm going through a list in my mind of what we think might be helpful in terms of our own efforts in this.

I say that because in terms of coordination though it is those things that produce those documents, to get everybody in the same room working at the same time. At the same time though there is the coordination I think on other issues, like work force, work force readiness, getting our people ready for the 21st century. If any of your team were here listening to me with Dr. Bloch, it's what are we doing to get people ready to teach junior high school science.

All the universities want research. I would like universities to do research, but I have a peculiar feeling, I would like universities to teach, and to teach also at an undergraduate level. And if we have a farm team for the NFL at our universities for a football league, we certainly should have at our universities a farm team for our future scientists, whether they come in the Government or whether they go into the private sector, and not everybody is going to be prepared for a Nobel Prize, that's dazzling, but I'm concerned about the shortage of lab technicians in our hospitals and our health care institutions. I happen to think that's a scientific career, somebody whose a psychologist now just reviewing those pap smears at Hopkins working on oncology both in terms of patient care and patient research.

So you see that's the kind of thing. You talk to Cavazos, you talk to Dole, and the question is, is everybody in the same room, and the message coming out from the White House is that we've got to really get people moving on this. That to me is the kind of coordination because Cabinet level, everybody responds to the White House.

Mr. Bloch sat here and said, because we asked him how he was working with the Department of Education exactly on elementary school and secondary school, and every scientist at this table will tell you when asked where do we lose our kids, we lose them about the time they are 11 to 13 and they start to drop off, and then the dropoff is considerable.

Well, we're not going to talk about science education here, but what Mr. Bloch says to me is that when they were over working with the Department of Education there was not an interest in science. Now I'm not saying that Dr. Cavazos doesn't feel this way, but there is this inertia at these working levels, and if the Department of Education is not working with Bloch, then why are we putting money into science education over at the National Science Foundation if it doesn't go into education and get out to the people who are trying to run those effective school programs that I know President Bush and Bill Bennett and Barbara Mikulski support.

It's those programs, not to go off on it, but the magnet schools in Prince Georges County that they are standing in line to get into are based on something called the effective school program. Well, the models coming out of the Federal Government are tremendously helpful. So, do you see what I'm saying? It's that kind of coordination and that I think the Science Adviser's Office is important to do that.

I'm also concerned about the work force in terms of our Federal Government and our ability to recruit and retain scientists, whether it's NIH over there with Jim Wyngaarden, whether it's our folks at the Bureau of Standards, whether it's Goddard, and I think we're going to be approaching a crisis in Government laboratories.

We have a maturing work force in terms of age. Just as the average science teacher is age 50, I would say that a lot of the folks—did you know the average science teacher is aged 50?

Dr. **Berger**. No; that's old.

SELECTION PROCESS

Senator **Mikulski**. I'm going to get you some of the National Science Foundation reports here. But you see, and this isn't to write a job description for you, but I think this is the kind of thing where it is bipartisan and we could work together on this. You know what Wyngaarden's problems are. I'm sure he has talked about it. That means I truly believe that the Science Adviser has to say to the President I know your OMB boys are telling you one thing, but here is what we are facing and have OPM, Jim Wyngaarden and whoever is going to be head of NASA laying out first of all what are our needs, how are we going to retain, first of all, and how are we going to recruit, and how are we even going to upgrade folks? Maybe that person with the bachelor's degree in medical technology doing basic laboratory testing at NIH with a little help from us can get his or her master's because they love NIH and nobody is over there for the money, we all know that, but are the personnel practices that we need to deal with.

Then the last thing I feel you need to do, because you do know who are the scientists, is the recommendation for sub-Cabinet level positions, whether it's in health, whether it's in environment and so on. You know the capable people and you know the people who have written brilliant research and are terrific at international conferences and head tables, but they don't know zingo about administrating, but you know the ones who can blend the two, and they ain't easy to find, I'm sure.

I think the competency to be brought into Government has to come from you because it's your field.

Dr. **Graham**. Yes, and we take that role seriously.

Senator **Mikulski**. So that's kind of the way I see it as well as some of these other issues.

Are we on the same track here?

Dr. **Graham**. Yes. As a matter of fact, I would certainly agree with all that. In fact, when I was running NASA we had the problem that you alluded to, and that was within about 5 years two-thirds of NASA is going to reach retirement age. A lot of them came in during the Apollo era and they are now at about retirement age, and replacing that work force and upgrading the skills of the people who will remain at NASA is a very large challenge to that organization, and without perhaps quite so much concentration in time as NASA has, it does apply to other agencies as well.

In fact, I tried to get some change in the civil service legislation when I was the Acting Administrator to give more flexibility to the agency in terms of salaries and job descriptions. I wasn't successful in that, but it's an effort I've kept an interest in and hope that at some point we'll be able to reach an accommodation with the Congress.

WOMEN, MINORITIES, AND HANDICAPPED IN SCIENCE

Senator MIKULSKI. Will either you as the Science Adviser or your successor be working on these work force issues both in terms of the need for science, and again when we talk about science, everybody wants to talk about the postdoctoral student, and I'm interested in the undergraduate and master's degrees where people do go into teaching, they go into the private sector, they're working at Johns Hopkins Hospital in patient care, they go into clinical pharmacology, poison control and rodent control.

Dr. GRAHAM. One of the big reservoirs of talent that is almost unused in this country in science is the women, minorities, and handicapped individuals. In recognition of that Congress passed a law mandating the establishment of a Commission on Women, a White House level Commission on Women, Minorities, and Handicapped a little over a year ago and put my Office in charge of arranging for that and guiding it through its deliberations. That group has involved all of the agencies in the Government that have any use of scientific or technical talent and I believe is at about the midpoint or a little past the midpoint in its deliberations.

Senator MIKULSKI. When do you anticipate your work being done on that?

Dr. GRAHAM. They will issue their final report in December of this year. They have issued an interim report. I don't know if we have a copy with us or not. If we do, we'll leave it here; otherwise we'll send it to you. It's an excellent report.

Senator MIKULSKI. But do you see yourself, or I'll say the Office, really pulling together these work force issues? Is this a role in addition to the Commission?

Dr. GRAHAM. Yes. It's a role which is certainly interagency in nature which OSTP can and has been playing a leadership position in, and this Commission, which has one part of the problem, the women, minorities, and handicapped part, has been doing an excellent job in that as well.

Finally, the only thing I would add to the list: since we don't have a Department of Science and Technology, when there is a need for foreign representation at the Presidential emissary level of science and technology, the Director provides that function, and in that role I have overseen the negotiation of several agreements with other countries, most notably with Japan in cooperation in science and technology, and we'll see that continuing as well.

R&D SPENDING

Senator MIKULSKI. Just coming back to the strategy for Federal R&D spending, and now I would like to just go to that which is traditionally regarded as civilian, do you have the various proposals under review for what I call the big-ticket items and will you be recommending to the President a series of priorities? I know he gave us his budget.

Dr. GRAHAM. In fact, the budget is something we involve ourselves with directly. Dr. Post was with the Office of Management and Budget before he joined OSTP.

Senator MIKULSKI. I know, from geology to MBA at Harvard, hard rocks all the way. [Laughter.]

Dr. **GRAHAM**. That's right, something like that, yes. We join in the budget process to the limits of the staff in the Office, which is substantial, but not what I would call comprehensive at this point. We pick and choose the budget issues we address.

That budget is a reflection of the President's priorities when it's finally put together. It's assembled by a process of the agencies first receiving guidance on various issues from the White House and taking their own initiative as well and bringing them forward. We have an iteration that for which OMB acts as the principal agent and, finally, if there are disputes, we take them up through a series of reviews to the President and he makes a series of decisions.

When I was the Acting Director of NASA I had to take one to the President and he decided, and he made a decision contrary to the rest of his organization. So that is a very viable and effective process. When it's finished, there is an ordering of the priorities denominated in dollars for all of the projects of the Government.

Senator **MIKULSKI**. Well, denominated in terms of dollars, do you mean they are listed in terms of the ones that are the most expensive are at the top of the list and then it goes down, or is it ordered in terms of national priority and in terms of our strategic needs, and I say strategic not in a military sense, but in a competitive sense.

Dr. **GRAHAM**. It's ordered in terms of, if you will, the resources that we think it requires at a given point in time.

PRIORITY SCIENCE

Senator **MIKULSKI**. You see, we have to decide, and I'm not saying these are the choices but, as I said, we can't do them all. So we've got, like in my subcommittee, we've the space station, but overall in appropriations we have the space station, we have super collider, we have the mapping of the genetic code, and all three of those are really big, and then there is the superconductor, but all three are really big tickets, significant big tickets. The question is then if you say well, maybe we can't do four, but we could do two, what would be the recommendations?

Dr. **GRAHAM**. The recommendation from the administration is necessarily that the budget that we sent forward is the President's budget and it represents our priorities and we don't have a second choice to the President's budget in this process.

Some of these are larger dollars at a given period of time because that's where they are in the program, like the space station, and others like superconductivity are extremely important, but smaller because that's the requirement they have at the moment.

We have put together an entire budget that fits within the constraints that are imposed upon us by fiscal responsibility, Gramm-Rudman-Hollings and so on, and that's the budget that we have proposed to the Congress.

Senator **MIKULSKI**. Well, according to your budget we're talking about the Superconductor Collider, we're talking about, and it's a little hard the way this is drafted to follow this, the National Aerospace Plane——

Dr. **GRAHAM**. It actually starts I think on page 2.

Senator **Mikulski**. So the high priority in this administration is space science, biomedical, the Earth observatory work, and not only the Earth observatory station, but the others concomitant with that.

Dr. **Graham**. Yes.

Senator **Mikulski**. Then you've got the space station and the super collider. And then in the biomedical you've got the human genome project. That's my whole point. I mean what does all that add up to?

Dr. **Graham**. I don't have the figures for a given year, but a large figure.

Senator **Mikulski**. And it's not meant to be a catchy question. But that's my point that I think these are going to be very difficult choices to make, and those choices and priorities are not within the purview of this particular hearing. But what I wanted you to lay out is some of the concerns of the Congress and certainly the Appropriations Committee.

In my Appropriations subcommittee, in addition to you, what we have is, I had last year a $60 billion portfolio. That's called my 302(b) allocation, and out of that went 30 percent of our discretionary spending, but of that $60 billion, $28 billion, or 47 percent, went to veterans' care, both the pension programs and veterans' health care. Then we moved on to fund housing, NASA, EPA, and NSF, and you see all of that has to add up to my allocation.

Dr. **Graham**. I understand, and I marvel at that process that gives you those to trade off against one another.

DIALOG ON PROJECTS

Senator **Mikulski**. It is an interesting job. [Laughter.]

So as we sit there doing those things, that's it, and that's why there needs to be in dialog with the administration on these projects.

Dr. **Graham**. We certainly understand that. I would say two things. One, we tried to put together a budget that is, in fact, complete and meets the constraints, and second, we have reviewed these projects, particularly the large ones, at the highest levels of the Government and looked at them in comparison to other projects and taken account of them not only for their intrinsic scientific and technical value, which is substantial, but also for their role in providing technological leadership internationally and motivation for our young people in this country.

Some people might question why we went to the Moon, but there are very few people who lived through that era that weren't genuinely touched by that program, and many of the scientists and engineers I meet from that era became interested in technology through the Apollo program.

We spend about a third of $1 trillion a year nationwide from all governments on education. If we can make a small improvement in the motivation and the willingness to learn of our students through programs which they can understand and see and appreciate, then that will certainly add to the scientific merit of the program to help our future work force.

ACADEMIC ACHIEVEMENT

Senator **Mikulski**. Well, that then brings me back to what I had said earlier about the universities and when they get this research. I don't feel they do that. I think the program does that.

I'm 52 years old. So I was a Buck Rogers kid and I was a college student when Sputnik went up. I was in my junior or senior year under President Eisenhower and music was beginning to rock and so did this country when Sputnik went up.

Then the way we ran and tried to scurry up the National Defense Act and scholarships at tremendous investment. Among many of my peers they were able to go to graduate school and so on because of that, and that's that aging work force you're talking about.

I was a young social worker when President Kennedy announced that we were going to go to the Moon and we were also going to end hunger in this country, inspirational goals. And then that's when I felt that the large institutions had a commitment to a national purpose.

I guess what disturbs me when I hear about the money that we fund these programs, that the money then goes to research universities, and the projects sound exciting, exactly what you said, it's inspirational.

They walked on the Moon on my birthday, and that's a very keen memory, but when they walked on the moon we all walked on the Moon. And it's not only that they walked on the Moon, but we saw it on television. We saw it live. That was also the other stunning thing, we saw it live.

Now the money goes out and research is done, and I find I'm not sure what then goes on out in the classroom. They want to attract the best and the brightest to research, which is fine, but the best and the brightest are not in the classroom. There is not an innovative look at universities in terms of maybe a multitrack way to academic achievement.

Some people are very gifted at research, but might not be too good in the classroom. That's OK. Some might be brilliant in the classroom, but they are not going to be the researchers, and they should have the opportunity for tenure and they should have the opportunity to go from assistant to associate professors in our schools because they are exciting. They go talk to that brilliant researcher and read all the materials and keep up to date and go in the classroom and really excite people, and then maybe in their excitement people say, "Well, I'm not going to go on to get my doctorate, but I would sure like to be out there teaching in our elementary and our secondary schools," or, "I want to be a Boy Scout leader or a Girl Scout leader," which as you know through your direct contact with science with the earth and the environment out there gets you excited.

See, I don't see that happening. I see that once the money goes to research it stops. I mean the research is done, but there is no creation and there is no multiplier effect of inspirational national goals in teaching people and inspiring people at any level. I'm real hot on this.

Dr. **Graham**. I understand your concern.

Senator **Mikulski**. Do you feel this way, or maybe you don't?

Dr. **Graham**. I have in fact looked into this, and I have been able to determine that a substantial part of the funds that go into universities for research are in fact going to training those young people and they become research assistants and lab assistants. They go into the research at the hands-on level while they are in graduate school and sometimes——

Senator **Mikulski**. But they're in graduate school.

Dr. **Graham**. And sometimes in undergraduate school. When I was a sophomore in college, in fact, I became a lab assistant to one of my physics professors and worked with his lab through graduation, and that was money being provided for the International Geophysical Year, a good program which the Government supported and which taught us a lot and taught me a lot personally about how to work in a laboratory and what to do.

So you're certainly right, the bulk of it goes to the more advanced students, the graduate students, but there is room for undergraduates and even now in the NSF there is a particular very modest fund for students at high school age being able to associate themselves with a research group in a university and get some experience before they go to college. All of those seem to me to be steps in the right direction.

EDUCATION DIRECTION

Senator **Mikulski**. Well, see, I want it more basic than that. I want really good people teaching biology 101 and physics 101 and being able to relate that in a way that gets them to take 202 and then maybe go to 404. That's what I'm talking about and how that happens in our colleges and in our universities.

I talk a lot to young people because I'm an advocate of national service and have some proposals along that idea, and they don't feel that that's happening to them. They feel that they've got some good teachers, but they feel they get the assistant to the assistant and it's real hard. I mean the higher up you go, the more you get. And I'm not knocking anybody who is now teaching the 101's, there is just not enough, and how that's tied into it. I think the universities have to take a look at how they are going to manage their teaching responsibilities along with their research, and again not every researcher is a teacher and et cetera, et cetera, and there should be room in our country.

I'll tell you what I think is exciting, and then we'll wrap this hearing up. See, I think President Bush is on to something when he talks about the thousand points of light. I know he has been razzed about it and so on, but I think it's very exciting to have a President talk that way because what inspired, and maybe we're not too distant in age when we talk about our benchmark experiences and our educational life, but what Jack Kennedy did was talk about a new frontier and then inspired us to be part of it. And when he said, "Ask not what the country could do for us, but what we could do for our country," we all got involved.

I was a social worker, and I wanted to be the best social worker in the world. I know that throughout this country whatever people were doing, they wanted to be the best at it, get involved and make a contribution.

I think when President Bush calls us to that, and I would like to take it beyond the inaugural speech out there, that he then call us to that, and that means every institution, every Government agency, the private sector and academia needs to then think about that.

I think President Bush has that capacity, and I think many of the Cabinet people he has appointed share that view and that's what we need. Inspiration is not a substitute for policy programs or resources, but I think it is a way of maximizing and multiplying our resources to encourage them to think innovatively and to think cooperatively.

SUBMITTED QUESTIONS

So we look forward to working with you on that. There will be some additional questions which we will submit for your response in the record.

Dr. **GRAHAM**. Thank you very much.

[The following questions were not asked at the hearing, but were submitted to the Office for response subsequent to the hearing:]

QUESTIONS SUBMITTED BY SENATOR BARBARA A. MIKULSKI

NEW SCIENCE ADVISOR

SENATOR MIKULSKI: Although the President has said that he will elevate the position of Science Advisor, he has not proposed any enhancements to the Reagan budget for the Office of Science and Technology Policy. How will the Science Advisor be able to perform an enhance role without additional funds?

ANSWER: The FY 1990 budget request of $2,027,000 represents an increase when compared with the FY 1989 level of $1,587,000 and the FY 1988 level of $1,887,000. The FY 1990 level, while austere, will permit staffing to return to nearly the level of FY 1988. OSTP intends to accomplish an enhanced role in the science and technology policy process with our selected staff of exceptionally high quality. An enhanced role is not necessarily equivalent to more money or manpower.

GLOBAL WARMING

SENATOR MIKULSKI: President Bush has said that fostering international cooperation on the Global Environment is one of his special areas of concern. How does the budget request reflect this?

ANSWER: The budget makes no special provision to budget for fostering international cooperation except for the increased funding for the U.S. Global Change Research Program.

The objective of that program is: "To Establish the Scientific Basis for National and International policymaking Related to Natural and Human-induced Changes in the Global Earth System." The budget requests a 43% increase in such research to a FY 1990 level of $190 million. This program is a key effort supporting the U.S. efforts to encourage orderly and responsible international cooperation on global change issues through the Intergovernmental Panel on Climate Change described in the answer to the following question.

SENATOR MIKULSKI: The EPA recently released a draft two-year study on global warming which includes a strategic plan to limit warming and eventually reverse the trend. The plan calls for such tactics as charging users of fossils fuels emission fees; major reforestation programs; and a total phase-out of CFCs.

These recommendations have very significant policy implications.

OSTP established the Committee on Earth Sciences to coordinate the nation's global warming research efforts, but what about the nation's policy efforts -- who's in charge of coordinating the policy?

ANSWER: The EPA draft study Policy Options for Stabilizing Global Climate does not "include a strategic plan to limit warming and eventually reverse the trend" as your question states. Furthermore, the draft study does not make recommendations.

It is very important to understand how the study is different from the kind of study implied by your question. The study has identified a number of technical options and policy options which, if implemented, could help limit greenhouse gas emissions.

These options have been identified as having technical promise of effectiveness in limiting emissions. Options have been screened based on judgements about their potential to be cost-effective. No attempt has been made to rank the cost-effectiveness of each option included in the study. No attempt has been made to estimate the government expenditures or total social costs or benefits associated with the options identified. Detailed cost and benefit analyses will need to be done before any recommendations can be made.

The magnitude, rate, and timing of any climatic change which might be caused by human activities is subject to very high scientific uncertainty. The National Academy of Sciences in a 1979 report said that, based on computer models, the most probable global warming from a doubling of CO2 is estimated to be 3 degrees C., with a 50% probability that it would be between 1.5 and 4.5 degrees. (That necessarily implies a 50% probability that it would be less than 1.5 or more than 4.5 degrees.) The latest National Academy of Sciences review of the matter and of the 1979 estimate, in 1983, led them to conclude that:

"the climate record of the past hundred years and our estimates of CO2 changes over that period suggest that values in the lower half of this range are more probable."

Because of this great scientific uncertainty and the recognition that solutions must be global, Secretary Baker in opening the January meeting of the Response Strategies Working Group of the Intergovernmental Panel on Climate Change made the following points:

- first, that we cannot wait to resolve all uncertainties before acting;
- second, that we should focus immediately on steps which are justified for other reasons;
- third, that global solutions should be as specific and cost-effective as possible;
- fourth, that solutions must reconcile the requirements for both economic development and a safe environment.

In short, that is the limited nature of the EPA draft study and the scientific and policy reasons why it does not "include a strategic plan" or make recommendations.

Currently, the Executive Branch's policy efforts have been focused primarily on getting the Intergovernmental Panel on Climate Change organized and started out on an orderly process to provide an international interface between science and policy. The panel should both identify for the scientific community information needed by policy makers to evaluate possible response strategies, and communicate to policy makers what is known -- and what is not known -- about climate change, in order to ensure that consideration of climate-related polices is based on solid scientific information. In this way, governments, and the intergovernmental community, will be able to address the issue responsibly.

These efforts have been carried out in interagency meetings, hosted by the Department of State, and in meetings of the Climate Program Policy Board of the National Climate Program Act. The Domestic Policy Council has provided policy direction to these interagency efforts.

The President's budget document stated that "The President will issue an Executive Order on global climate change setting out the responsibilities of Federal agencies and departments as well as establishing effective coordination mechanisms." At this time, such mechanisms are still being considered and evaluated within the Administration.

SENATOR MIKULSKI: When will an interagency group be established to deal with the nation's global warming policy?

ANSWER: As earlier indicated, a number of options are being considered and upon completion of the review, the President by way of an Executive Order, will establish the interagency group.

NATIONAL STRATEGY FOR OVERALL FEDERAL R&D STRATEGY

SENATOR MIKULSKI: Do you believe it's possible to establish a national strategy for overall Federal R&D spending? What role should OSTP play in establishing such a strategy? What role do you believe the Nation's scientists and engineers should play in the establishment of R&D priorities? How can we do a better job to get that contribution? What are the major obstacles to developing such a strategy?

ANSWER: The annual budget submission of any Administration to Congress automatically provides an implicit strategy for R&D spending as the outgrowth of the process of formulating a budget. A major task of OSTP is to provide additional focus and overall policy guidance for federally-funded R&D. At the higher levels of detail and specificity of R&D programs, an increasing amount of the action and responsibility must fall to the agencies.

Engineers and scientists play a crucial role in the generation and the peer review of research proposals. OSTP has historically been a place where individuals and professional organizations can present their views and ideas (e.g. research priorities) and obtain a hearing. One of the roles of OSTP is to provide a forum to maximize the contribution of the nation's scientists and engineers.

An overall research strategy must recognize the fundamentally different nature of civilian R&D, as compared with most military R&D. For example, 92% of military R&D is in the category of development -- specifically engineering and systems development new weapons systems which are planned for future production. This latter category of R&D, then, is not elective once a firm decision has been made to proceed with a given weapons system.

MEASURING THE EFFECTIVENESS OF R&D PROGRAM

SENATOR MIKULSKI: How are you measuring the effectiveness of our R&D program in meeting the nation's Science and Technology needs, and what do you do with those measures?

ANSWER: There is no one measure of effectiveness. In the case of basic research, perhaps the most fundamental measure is the rate of scientific progress (e.g. new discoveries) in the various research areas. Areas with rapid rates of progress (e.g. biomedicine) tend to receive continued strong support. Other areas characterized by a maturity in the scientific results, and a slowdown in the rate of progress do not normally receive increased support. In the case of applied research, the measure of effectivenes must consider the various missions of the host agencies.

SENATOR MIKULSKI: The science and engineering infrastructure -- personnel, research facilities and equipment -- may be in serious trouble according to many reports. How can we be sure that Federal R&D funding is helping to prevent such problems from happening and is working to improve the situation? Do you feel that such a goals important? Can we meet it without compromising the other objectives of our R&D program? What do you think we should do to strengthen the S&T infrastructure?

ANSWER: The health of the R&D infrastructure is a fundamental and continuing concern. It requires not a "get well" approach but rather an institutionalized multi-year approach. While it is not possible to make any sweeping generalizations, one fruitful approach, for example, would be to set up a Basic Research User Facility (BRUF) account which would provide an orderly approach to maintenance of the existing user facility complex, with multi-year funding for the most urgent maintenance projects. Such an account will also help provide an ongoing assessment of the R&D infrastructure.

SENATOR MIKULSKI: If large science and engineering projects are necessary in some cases to advance a particular field, how can we test to see how those projects will do in meeting the cross cutting objectives, particularly on major projects? How do we do this while protecting the long term economic interests of this Nation?

ANSWER: Typically, large projects meet several objectives, including political objectives. For example, the SSC will further international cooperation on high energy physics, maintain U.S. leadership, explore new regimes of high energy physics, and be visible evidence to our youth of the commitment of this nation to furthering fundamental knowledge. Funding for such large projects reflects a commitment of resources at the national level, rather than a detailed trade-off within a fixed amount of R&D funding that -- if a large project were disapproved -- would otherwise have been allocated to other research projects. As with other large projects (e.g. roads, dams, etc.) the long-term economic costs must be balanced against an assessment of the long-term benefits -- both tangible and intangible.

COOPERATION ARRANGEMENTS WITH INTERNATIONAL PARTNERS

SENATOR MIKULSKI: There are increasing pressures to enter into cooperative research arrangements with international partners, particularly on major projects. How do we do this while protecting the long term economic interests of this Nation?

ANSWER: In a number of cases, cooperative research arrangements can protect the long term economic interests of this nation by spreading the costs of a large research project, and otherwise pooling the resources of several nations. While in principle this could lead to acquisition by foreign nations of U.S. technology, this kind of transfer can occur in both directions.

MATH AND SCIENCE EDUCATION

SENATOR MIKULSKI: What are some ways we can use our R&D efforts to enhance math and science education, not only to produce scientists and engineers, but to improve the science and math literacy of the entire population? Should this be a major goal of our R&R programs?

ANSWER: One promising promising way to enhance math and science education is through tutorial programs. Such teaching aids should continue to be developed. Our actual R&D programs are an appropriate vehicle only insofar as they could promote individual scientists to participate in local outreach programs focussed in this area.

DEFENSE VS. CIVILIAN R&D

SENATOR MIKULSKI: How should we review the balance between defense and civilian R&D?

ANSWER: It is difficult to speak of a balance between defense and civilian R&D, because the nature and objectives of the two programs are so different. As previously discussed 92% of military R&D is in the category of development -- specifically, engineering and systems development of new weapons systems which are planned for future production. Defense R&D is not elective once a firm decision has been made to proceed with a given weapons system.

INDUSTRIAL TECHNOLOGY

SENATOR MIKULSKI: Do we need to focus our R&D efforts more effectively on problems and opportunities about industrial technology; e.g., High Definition Television, superconductivity, advanced materials, etc.? Is some reallocation of resources called for?

ANSWER: The most crucial issue here is not R&D as such, but rather efficiently making the transition between R&D and industrial production in various industrial technologies. Our most serious hurdle lies in the private sector's ability to commercialize and capitalize on the research results generated in our own R&D establishment.

ESTABLISHING R&D PRIORITIES

SENATOR MIKULSKI: What role did OSTP play in establishing R&D priorities for the 1990 budget request and what do you envision for FY 91? Will you adopt the National Academies approach? Do you have the resources to carry out such a review?

ANSWER: OSTP worked closely with the Office of Management and Budget throughout the fall budget review. We anticipate that this will be the case again next fall. The proposed increase in OSTP funding for 1990 should make possible a more comprehensive budget appraisal by OSTP than that of the preceding fall. The NAS believes that basic research should have the highest priority. We concur. The NAS also implicitly assumed that the size of the R&D "pie" was largely fixed, and that science projects would compete with each other for the same funds. We, at OSTP, on the other hand, have recommended an increased total level of funding to accommodate large programs such as Space Station Freedom and the SSC. This increased total funding reflects the assessment that these large projects merit dedicated funding at a national level.

TRAVEL

SENATOR MIKULSKI: You are requesting $130,000 for travel, an increase of $55,000 or 73%. Why is such a substantial increase necessary?

ANSWER: Of the $130,000 requested for travel, only $85,000 is for travel normally undertaken by OSTP staff in carrying out the agency's mission requirements. This is a 13.34-percent increase over the current FY 89 appropriated level and 15-percent less than that expended in FY 88. The remaining $45,000 will be utilized to support new travel costs associated with: (1) the US-China Science and Technology Cooperation; (2) cooperation under the US-Japan Science and Technology agreement; and (3) National Advisory Committee on Semiconductors.

SENATOR MIKULSKI: Please provide a breakdown of travel costs associated with U.S.-China Science and Technology Cooperation; cooperation with the U.S.-Japan science and technology agreement; and the National Advisory Committee on Semiconductors.

ANSWER: The following information is provided for travel costs associated with new OSTP initiatives:

-- US-China Science and Technology Cooperation:	$20,000
-- US-Japan Science and Technology Agreement:	$20,000
-- National Advisory Committee on Semiconductors:	$ 5,000

QUESTIONS SUBMITTED BY SENATOR J. ROBERT KERREY

BASIC SCIENCE

SENATOR KERREY: Dr. Graham, you note that the top Bush priority in science is support for basic research. How is this reflected in the Bush budget? If funds were not being committed to big projects, such as the space station and the superconducting super collider, couldn't we do more for basic research?

ANSWER: The priority for basic research is reflected in the proposed doubling of of the NSF budget by 1993, in increases for space science and in the support for the SSC. Since the funding for the large projects is project specific, cancellation of those projects would be accompanied by a removal of funds from the President's budget. Thus, it is very difficult to predict how much, if any, additional funds might be provided for other basic research by cancellation of any of the proposed large science projects.

BUSH VS. REAGAN BUDGET

SENATOR KERREY: For the record, would tell me specifically -- by program and dollar amount -- how the Bush budget differs from the Reagan one for science and technology. We have NSF before this subcommittee; we have NASA; we need to know.

ANSWER: The budget information is found in the February 9 report "Building a Better America". That report identified the science and technology priorities of the Bush Administration within the overall budget constraints of the flexible freeze. As can be seen from the report, the science budget for the Bush Administration represents a of continuity with the Reagan Administration.

DOD R&D

SENATOR KERREY: You note that about 92% of the DOD R&D is in support of specific new weapons systems, in response to specific Defense plans.

(a) what is the other 8%?

(b) Are there any spin-offs that help us technologically industrially or in trade?

ANSWER: The other 8% of the budget is primarily for applied research, generally related to specific weapons systems. About 0.3% of the DOD budget is for basic research.

Historically, there have been numerous spin-offs from Defense research to the commercial sector. Perhaps the most significant one has been in commercial aviation, which continues to be a positive contribution to our overall balance of payments. The military programs have also been a stimulus for our electronics industry.

US INDUSTRIAL POLICY

SENATOR KERREY: Do you have a position as to whether or not the U.S. should have an industrial policy?

ANSWER: While there is a bias against the Federal Government "picking winners and losers", there is a growing recognition that the U.S. is in danger of losing its position in a number of strategic technologies such as HDTV, supercomputing, DRAM's, machine tools, numerical controllers and others. One of the dominant roles of the Federal Government in U.S. commercial enterprise should be as a buyer, stimulating the market place to produce more advanced and innovative products, knowing the Federal Government will purchase them.

SUBCOMMITTEE RECESS

Senator **Mikulski**. The subcommittee will stand in recess until next Monday, April 10, when we will be talking to the Environmental Protection Agency.

[Whereupon, at 12 noon, Tuesday, April 4, the subcommittee was recessed, to reconvene at 1:30 p.m., Monday, April 10.]

VA, HUD AND INDEPENDENT AGENCIES APPROPRIATIONS FOR FISCAL YEAR 1990

TUESDAY, MAY 2, 1989

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 10:07 a.m. in room SD–138, Dirksen Senate Office Building, Hon. Barbara Mikulski (chairman) presiding.

Present: Senators Mikulski, Garn, Gramm, Grassley, and Kerrey.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

STATEMENT OF DALE D. MYERS, ACTING ADMINISTRATOR

ACCOMPANIED BY:

- DR. NOEL W. HINNERS, ASSOCIATE DEPUTY ADMINISTRATOR
- THOMAS CAMPBELL, COMPTROLLER
- REAR ADM. RICHARD H. TRULY, ASSOCIATE ADMINISTRATOR FOR SPACE FLIGHT
- DR. LENNARD A. FISK, ASSOCIATE ADMINISTRATOR FOR SPACE SCIENCE AND APPLICATIONS
- THOMAS L. MOSER, ACTING ASSOCIATE ADMINISTRATOR FOR SPACE STATION
- DR. ROBERT ROSEN, ACTING ASSOCIATE ADMINISTRATOR FOR AERONAUTICS AND SPACE TECHNOLOGY
- ROBERT O. ALLER, ASSOCIATE ADMINISTRATOR FOR SPACE OPERATIONS
- GEORGE A. RODNEY, ASSOCIATE ADMINISTRATOR FOR SAFETY, RELIABILITY, MAINTAINABILITY AND QUALITY ASSURANCE
- DR. C. HOWARD ROBINS, JR., ASSOCIATE ADMINISTRATOR FOR MANAGEMENT
- MS. MARGARET FINARELLI, DEPUTY ASSOCIATE ADMINISTRATOR FOR EXTERNAL RELATIONS
- EDWARD A. FRANKLE, GENERAL COUNSEL
- L. HERBOLSHEIMER, DEPUTY ASSISTANT ADMINISTRATOR FOR COMMERCIAL PROGRAMS
- MS. BENITA A. COOPER, ASSISTANT ADMINISTRATOR FOR HEADQUARTERS PROGRAMS
- FRANK MARTIN, ASSISTANT ADMINISTRATOR FOR EXPLORATION
- DR. HARRIETT JENKINS, ASSISTANT ADMINISTRATOR FOR EQUAL OPPORTUNITY
- A. FOSTER FOURNIER, DIRECTOR, PROCUREMENT MANAGEMENT DIVISION.

OPENING REMARKS

Senator MIKULSKI. Good morning everyone. The subcommittee will come to order. It is a pleasure to begin the first of 2 days of hearings on the NASA fiscal year 1990 budget. We welcome both NASA's Acting Administrator, Mr. Dale Myers, and the Administrator-designate, Adm. Dick Truly.

This year the Agency is requesting a 22-percent increase over last year that would put NASA's budget at $13.3 billion. The most prominent enhancement in this request is the proposed $2 billion level for the space station program, up 125 percent over the 1989 appropriation. As many people know, I am an avid supporter of our Nation's space program, and was a child during the space age, growing up reading Buck Rogers. I remember the day when John Glenn circled the Earth. Ironically, I was on my way to visit a Baltimore City public housing project.

It is the space program which has helped us achieve some of our greatest technological breakthroughs in science and technology, and it was John Kennedy's call that sent the man to the Moon and returned him safely, which galvanized a generation to devote itself to science and engineering, in pursuit of civilian space rather than in response to a national threat.

NASA faces a difficult challenge this year. While it is proposing a very large increase in its budget, the largest of any agency in our subcommittee, domestic discretionary spending as a whole will only grow by a few percent above inflation. That dilemma will mean hard choices for this subcommittee, and it is my hope that we will be able to determine what NASA believes is its absolute core program so that we have the information we need in this difficult budget year.

In addition, I look forward to some of the management items to be discussed which were in NASA's transition document. Our goal is to work with this Agency. It is not to chastise or criticize. NASA suffered too much from the criticism of the *Challenger*. We think NASA's management team worked very hard to restore confidence in America's space program and we congratulate you on that. We think just as space is on the brink of a new frontier, we think NASA is, too. We look forward to working with the Agency to develop our space program really for the year 2000.

Before I turn to my colleagues for their opening statements, I just want to say that in the GAO transition document, they raised issues about strategic plans, life cycle cost management, and launching missions on time to avoid costly delays. Those are some of the technical things, but we will also look forward to hearing what NASA is doing in terms of really providing the inspiration that is needed in our science and our technology because yours is the most visible agency.

I must say when I toured some of those space facilities with you, Admiral Truly, I was really impressed at what we were doing down there in Alabama, and it was kind of like, if you will, the Bethlehem Steel of the space program. It was nuts and bolts and no nonsense and no frills. I was so impressed with the spirit, the energy there, the way the private sector and the community was so much part of a NASA program, and then the space camp where we saw that again a State, working in conjunction with NASA, was reaching out to get our young kids involved in science and in technology, and also our own teachers. It was really quite an experience.

Then on to Cape Canaveral to see what they were doing, and again to be very impressed at both the management there in terms of how, with its responsibility for the shuttle launch, their meticulous attention to detail, recognizing that we don't live in a no-risk society. We talked at Cape Canaveral about the spirit of NASA, the energy of NASA, the commitment to America's space program, from the community college next door to recruit young kids to being up there in the future.

Then, without you, Admiral, we went to JPL. That was perhaps a more disappointing experience. Maybe it's because they're not tied into NASA. I didn't sense the same sense of morale there. What I saw was the scientific pursuit for science's sake, not unlike maybe what Madam Curie would have thought about herself, but Madam Curie was not funded by a Federal Government. Madam Curie was not part of an overall taxpayers 'investment in the future.

I don't wish to comment on JPL's ability or scientific pursuit, but somehow or other I didn't feel that they sensed that we were making public investments in America's future and that they were part of an effort; that a cop on the beat, a school teacher, a checkout woman at Giant food market that might only end up with varicose veins was willing to pay our taxes to go into space, and that therefore it was part of a national commitment so that this country's future would be secure in our science and technology.

We would hope that as we work with our scientific community, that they understand that our grants and our investment in them are not giveaway programs or entitlements, but they are part of a great national effort and pioneering spirit.

I only say that because I went many places and I was just so impressed at how people not only wanted to rebuild the space program, but they want to go beyond rebuild and remake, and take us into the future. So we look forward to hearing you and what you think is the must do list for NASA for the 21st century.

Senator Garn, I would be happy to yield to you for any opening statements of my colleagues.

RANKING MINORITY MEMBER'S OPENING REMARKS

Senator GARN. Thank you very much, Madam Chairman.

Mr. Myers, we are happy to welcome you here today, and Dick Truly, we are pleased to have you and look forward to your confirmation as Administrator of NASA. I congratulate the President on what I think is an excellent choice to head NASA.

After my 1985 flight aboard the space shuttle *Discovery*, I remember being incredibly frustrated by my inability to express in words the incredible beauty of our planet Earth, and also sadly, I must confess, that since that time my words have also failed to convince a majority of my colleagues how critical the investments in NASA are to our Nation's technological leadership and future economic competitiveness.

Believe me when I say that the budget cuts made in the NASA budget in the past few years have not resulted from lack of effort. I and many others have spoken at length about the indispensable benefits and spinoffs flowing from aeronautics and space investment. I have also repeatedly pointed out that our Government has not spent a dime in space; that each dollar appropriated for NASA is spent right here on Earth, generating new jobs and new technologies which will benefit all Americans. Finally, I have continually confronted the shortsighted mentality of people and especially politicians who refuse to consider the effect of their decisions beyond next week or the next election.

I have often spoken about lives saved and lives improved and jobs created by our investments in aerospace technology, and the critical nature of these investments to the health of our economy as we approach the 21st century.

It is alarming to me to consider the ever-quickening pace of technological innovation and change because I fear our society and our Government may soon discover the rest of the world just rushing by us, blowing by, not lagging 1 or 2 years behind, but dramatically surpassing our capabilities and widening their lead.

When I consider that during just my father's lifetime, the world went from the first powered flight at Kitty Hawk to Neil Armstrong's walk on the Moon, and in my own life from state-of-the-art biplanes made of cloth and wood to orbital flights and reusable spacecraft at mach 25, it is truly awesome to guess what my children will experience, and their children during their lifetimes. I can only hope that we will be active participants and not merely distant observers. They, too, will be asked that the wealth of the Nation be more equitably distributed rather than enduring the plight of less developed nations in having to retain our limited basic necessities.

We are seeing some evidence of a changed perception of the status of our Nation. With less frequency our demands for funding programs are rationalized on the basis that this is the richest Nation on Earth, and indeed with the Federal Government's deficit problems the terms fairness and current level have become the hallmarks of budgetary debate. Unfortunately, this new standard of funding by percentage increments fails utterly in addressing our Nation's changing status in an increasingly more competitive global environment.

Rather than simply perpetuating previous levels of effort, we must renew our commitment to investment in technological innovation. We must overcome the current policy of inertia which has established itself as the principal standard of budgetary justification.

That is why I am not concerned over the large increases proposed by the President for NASA or the National Science Foundation. The Administration must exercise leadership in these critical times and propose the resource shifts needed to meet the challenges confronting this country.

What does concern me is our failure in recent years to enact into law these needed investments in our principal science and technology agency. This is especially worrisome with respect to NASA's fiscal year 1990 budget request. While nominally a 22-percent increase, almost all of the funds requested are for previously approved programs and activities. This means that unless the Congress improves upon the performance of recent years in appropriating the level contained in the President's budget, the adverse impact on continuing projects will be substantial, if not devastating.

I look at what the Budget Committees have passed, and although it's an improvement over where they started from, we're still $1 billion short. Normally we'll end up, in the past few years in the Appropriations Committee, appropriating less than that with the 302(b) allocation problems that we have.

My looking at the budget right now, as presented by the Budget Committee for floor action this week, eliminates the space station. I don't think there is any doubt about that. Unless we are able to change that in this committee, there will be no space station. Now, I listen to the Budget Committee's justification, and they say, "We haven't done that. That is not in our budget. NASA can play with the funds the way they want to."

I listen to all of that and I understand what they're saying, but they haven't worked with the intricacies of this budget like I have for the last decade. When you start looking, it is important what I said about the funding being for existing programs. We're not talking about new programs. So when you start manipulating that $14.3 billion, unless you dramatically cut back another part of NASA, which a lot of my colleagues are not willing to do, and I don't want to do either—and the space station is the new boy on the block—I don't see that there is sufficient money in the Budget Committee's allocation to build a space station.

So I appreciate the remarks of our chairman and her continued support of science and space in this country, and I hope in this process we are able to come out with a level where we can move along with the space station and other vital programs as rapidly as we can.

I would also just briefly comment about the launch last Friday. I don't know that I have ever observed a launch that went more perfectly or weather that was better, and what some may not be aware of is that if there had not been a 4-minute delay earlier because of rain safety, that particular pump that failed had been running for 8 hours and shuts down at 9 seconds prior to launch, it is not an in-flight pump. So sometimes the little delays beforehand, 4 minutes for rain safety was plenty of time, because it worked, I believe, Dick, until a minute—shut down a minute before, so you had 3 minutes to spare. That pump would have been shut down and no problem.

But I commend you in observing that launch, even though it stopped, in the professional manner in which it was conducted. I don't think I have ever observed one that looked better right down to that 31 seconds.

Thank you, Madam Chairman.

Senator Mikulski. Thank you, Senator Garn. I feel that this committee is indeed very fortunate to have someone with your experience and expertise as the ranking member on this subcommittee. I think our backgrounds are quite complementary and we're going to do good things.

Senator Kerrey, do you have an opening statement?

Senator **Kerrey**. I do, Madam Chair. I have a lengthier opening statement that I would submit for the record.

Senator **Mikulski**. Without objection.

[The statement follows:]

STATEMENT OF SENATOR J. ROBERT KERREY

As a new Member of the Senate, I am pleased—and proud—to be a member of the subcommittee with jurisdiction over the National Aeronautics and Space Administration.

There is always some risk in citing personal experiences, but today I want to take that risk. I was a patient in a veterans hospital when men—Americans of my generation—first walked on the Moon. I watched with awe, with pride, and with admiration. And not only did I see the technological genius of a huge Saturn rocket placing mortals on the rocky surface, I saw the hope and inspiration that come from achieving a truly glorious dream. I saw that we can reach out and do what generations have perceived as the un-doable. I saw that we as individuals and as a Nation are more than what we are—we are all the things we want to be and are willing to dedicate ourselves to being. I was changed by that experience and, if Norman Cousins is correct, my recovery might have had something to do with the new attitude which came from the realization that we should, indeed, reach for the stars

This summer my son will go to Space Camp at Huntsville. He is, of course, very excited, and I see the opportunity for new vistas in his life. The commitment is still there—and so are the possibilities.

I expect to be a strong supporter of NASA—I know you already have several on this subcommittee—and I hope to become quite knowledgeable about your activities. I won't be without my critical eye. Like the chair, who sent me one of her speeches from a few months back, I am interested in seeing some new approaches to budgeting and some efforts at life-cycle costing. Overruns serve no one well. I am interested in the space station and exactly what it can contribute to our Nation's scientific and economic well-being. And, I am very interested in tradeoffs, which may have to be made between the station and other scientific programs. I am interested in spinoffs and technology transfer and how these can improve the competitive position of U.S. industry

I look forward to working with you on these matters.

OPENING REMARKS OF SENATOR KERREY

Senator **Kerrey**. I would point out only in the aftermath of Senator Garn's excellent opening statement that one of the problems we have in a representative democracy is that we've got to make the sale. We have to make the sale complete. We can't simply just describe the product. We have to in the end close in some way.

I, as a new Member to the Senate and to the Appropriations Committee and to this subcommittee, would make a couple of observations about why I think that sale has been incomplete for NASA, what's missing.

I came this morning from a meeting with some Nebraskans who were, in fact, unsolicited, urging me to try to get some additional money for projects that I won't even mention here now. You've probably heard of none of them. And they were suggesting they get the money out of the space station. They probably would have been amused to hear that maybe the space station isn't going to be built. I think that sale has not been made, in short, listening to these folks from Nebraska describe it.

We can say, well, that's their shortcoming. That's their problem. If they were only more enlightened, if they only had read more and understood the program. Well, I don't believe that way, in fact. I believe, in fact, in democracy. If we've got something that is worthy of being sold and we're unable to sell it, that in fact it's our shortcoming, not the part of the people.

One of the things that I observe about NASA is that I've become confused about where it is that we're going. I must tell you that at the low point of my life, 1969, at the Philadelphia Naval Hospital, was also the year that was referenced in Senator Garn's statement, with Neil Armstrong's walk on the Moon. NASA has the capacity to inspire. NASA has the capacity to show us that we can do the impossible. NASA has the capacity to make us forget, much the way any great accomplishment does, ideological differences; makes us forget that we didn't think it was possible to get along with the world; makes us begin to see the world as something different than we sometimes see it when we're sitting here on Earth, fighting back and forth for a variety of reasons.

So I urge in your new position consideration be given to why are we failing to sell. I would point out a few things that I see as being a problem. One is the resolution of where it is that we're going. I must parenthetically say that I enjoyed reading about a man by the name of Wendell Mendell, who was described as a committed Moon man in the Washington Post account of the NASA programs. I find myself being intrigued by the exploration of planets. I find myself intrigued by all kinds of other proposals.

The problem that I think that we have sometimes with NASA is that we see all sorts of offerings, but we don't understand—we on the outside don't understand how to connect them all together and we don't, as a consequence, end up with a fully committed Nation.

Though I opposed the project, I was fascinated and still am fascinated with the way in which the Strategic Defense Initiative was sold. It was a tremendous example of a clarity of vision, a tremendous example of a clear statement of purpose. Though again I didn't buy the package myself, I was impressed by the clarity of the sale, and I think NASA needs a similar kind of sale again to the American people.

I personally think that the more that we introduce military components to it, the less enthusiastic people become. I become less enthusiastic about it. The more we introduce civilian components, with all due respect for the contributions that Senator Garn is able to make now that he has ventured into space, the less enthusiastic—unless you just don't happen to like John Denver's music and think maybe he should go into space—those kinds of civilian things, I think, are extremely risky and add only marginally to the enthusiasm that people feel just watching a successful voyage and just seeing the Earth from space and just beginning to imagine that the things that we've only dreamed about quietly are possible through NASA.

So I would urge, as you sell to us and as you sell to the Nation, spend time on that clarity of mission that I believe is awfully important if we are going to be able to do a good job of fighting for increased appropriations on your behalf.

Senator MIKULSKI. Thank you, Senator Kerrey.

Senator Gramm, did you have an opening statement?

OPENING REMARKS OF SENATOR GRAMM

Senator **Gramm**. Madam Chairman, thank you.

Let me first welcome our witnesses. President Bush has proposed what I believe is the strongest space and science budget in American history. It's an attempt to reorder the priorities of the Nation as manifested in the budget, to deal with opportunities and challenges. Our problem is that the budget gets set in a mode of thinking, where everything is focused not on what we should be doing, not on what the new and emerging priorities of the Nation are, but based on what we spent last year.

Our problem with science and space is basically a problem that they're focused on the future and the future has a very small, poorly-defined constituency. As a result, Congress always invests more in the next election in programs that have big political constituencies than it does in the next generation by investing in science and space in the future.

So we are debating jobs here, only we're debating jobs in the 21st century. We are debating housing and growth and nutrition, only we're debating quantum leaps forward in terms of our capacity to really deal with these problems, rather than just spreading the misery and rubbing everybody's nose in it.

Our problem is that very few other programs in the Federal Government are asked to inspire anybody. I have never been inspired by the HUD program. Certainly not by their efficiency. I am inspired when we talk about the dream of private home ownership. But basically NASA is challenged to inspire because there is not a big constituency for the future.

In looking at space and science, we are not asking people to spend money because there is a big, well-organized constituency out there that's going to vote for or against somebody in the next election; we're talking about fundamental scientific investments in the future. Therefore, we have to appeal to the best instincts. We have to inspire. I think that's a critical factor here. I think it's something we always have to be working on. I believe the American people can be sold. I think it is a difficult and challenging task.

I believe in what NASA is doing. I think this country under-invests in the future. I have agonized in the last few years as we have looked at reductions in the President's levels of proposals and budget authority for the space program and for science and technology in general. I'm happy to have an opportunity to be here and be on the committee.

Finally, let me say, Madam Chairman, that while you and I do not always reach the same conclusion, we always have the same starting point. And that is the lady, as you expressed it so well, the lady working in the grocery store that has only one guarantee and that is getting varicose veins. I believe the objective of the Government should be to undertake those things that are going to benefit that lady. I believe the space program does benefit that lady not only by inspiring her, but by advancing the Nation that she is proud to be identified with.

I think we all have to work in seeing that that message gets through. I think also those of us in public office have to sometimes take a longer view. It is a very difficult and dangerous thing politically to do that, but we appreciate the inspiration of NASA because it helps us do it.

Thank you, Madam Chairman.

Senator MIKULSKI. Thank you, Senator Gramm. And we do agree: That lady with those bad legs is willing to do that to not only help herself but help her children. There are a lot of kids walking around now because of pediatric pacemakers that came out of the space program.

Now, Mr. Myers, we're going to turn to you. We would like to just apprise our members that votes will begin at 11:30 and we'll decide at that time whether we'll continue after 12 because there is a Holocaust memorial.

Mr. Myers, we're going to ask you to confine your comments to roughly about 10 minutes so we can get into our questions and answers. Of course when we adjourn today, we will be here tomorrow.

Let me just say this. We really appreciate all the work you've done, Mr. Myers. We look forward not only to your testimony, but to your management. And we are so pleased, really. We thought we had a good deal with your predecessor, Dr. Fletcher, but we think we've got a superb deal with you.

So we are looking forward to your testimony. I know all eyes right now are on the cape. Perhaps you might want to begin with a few comments on the Shuttle Atlantis and the Magellan payload, tell us kind of the status of that, and then the battle against pumps, and then the battle against the budget.

Mr. MYERS. Madam Chair and distinguished members, I am very pleased to be here today for this testimony.

First, we did have a beautiful countdown last Friday, with great weather. It was one of the least troublesome countdowns we've ever had in the shuttle program, and it was stopped at 31 seconds prior to launch. We had difficulty with a small recirculating pump that pumps hydrogen and conditions the rocket engines prior to launch. We had a failure in the pump at a few seconds before the 31-second automatic cutoff.

Over the weekend we have changed the pump and another pipe that had a small leak in it. I think the NASA team has done a superb job in responding to the difficulties. At the time, we thought we might be able to launch Friday or Monday of this week. It has been determined that we can launch on Thursday. And so, weather being with us, we will be able to launch the Magellan mission on Thursday of this week.

With your approval, I would like to submit my formal statement for the record——

Senator MIKULSKI. Without objection.

Mr. MYERS [continuing]. And begin this morning with just a few of what I believe to be the most salient issues surrounding this budget request. First I'd like to note that, like Jim Fletcher, I was drafted by President Reagan to come back after the *Challenger* accident to stay until the end of his administration; I'll be leaving on May 13, after these hearings and the Magellan launch.

I feel very satisfied with what Jim Fletcher, Dick Truly and his team, all of NASA and I have done in the last 3 years. With the full support of Congress and the administration, we are back on track. Please keep us from being derailed.

At the table with me today are Admiral Richard Truly, the Associate Administrator for Space Flight and President Bush's nominee for Administrator of NASA; and Dr. Noel Hinners, the Associate Deputy Administrator. I should comment here that Dr. Hinners is also leaving NASA at approximately the same time I am. We have a very formal hierarchy in NASA as to who is in charge at any given time. When Jim Fletcher left, I became the Acting Administrator. When I leave, Noel Hinners will be the Acting Administrator. When both of us are gone, Dick Truly will be the Acting Administrator. We're not trying to usurp the privileges and the responsibility of the Congress in the confirmation of Admiral Truly; it is just the way we cover the management of NASA when others leave. So on May 14, Dick Truly will be the Acting Administrator of NASA.

Dr. Len Fisk is here, the Associate Administrator for Space Science and Applications; and Tom Campbell, our Comptroller. The other key members of NASA senior management are seated behind me.

As you continue your review of the President's fiscal 1990 program for NASA, I'd like to stress once again that we really are at a make or break point in America's civil space enterprise, and Space Station Freedom is at the focus. This is the single most important fact that I want to leave with you as I discuss our fiscal 1990 budget request today. For the record, my message is that without the Congress' approval and appropriation of essentially the entire NASA budget request, the keystone of the future, the Space Station Freedom, will be the victim. That is the stark truth of the matter.

Essentially all of our budget is for programs already approved by Congress and initially funded in previous years. Only 1 percent of the budget is for new work. We are requesting one spacecraft as a new start, the Mariner II missions to Saturn and to a comet.

Turning now to the numbers, we are requesting a total NASA budget of $13.3 billion, of which some $900 million supports aeronautics and $12.4 billion supports space activities. The breakdown by appropriation is $5.8 billion for R&D, $5.1 billion for what we call SFCDC, $2 billion for R&PM, and $342 million for facilities, and $9 million for the Inspector General.

Last year when we presented the fiscal 1989 budget to the Congress, we pointed out that this year, 1990, would require a level of $13.3 billion to continue the careful program of space flight recovery and improvement; to continue the full-scale development of Space Station Freedom; to maintain the pace of our science and aeronautics programs; to improve our technology efforts that have been neglected for a long time, and to keep our core technology capabilities, our people, dynamic and productive.

Our fiscal 1990 budget is within that amount projected last year. It goes without saying that it is a tight budget being submitted in a very tight year. We have already had to accommodate a significant reduction to our aspirations in the budget process. What remains has little, if any, flexibility.

This budget is predicated on successfully funding private investment in several important and time-critical program elements. We have recently concluded that the Flight Telerobotic Servicer does not adapt to private financing and have agreed with the administration to absorb its 1990 funding requirements in the space station.

Taken together, these private investments represent more than $150 million of what would normally have been included in the fiscal 1990 program costs, with an estimated runout of about $550 million.

Be assured that we are going to do our level best, with your critically important help, to create the necessary environments to attract private sector investment in these facilities and developments where they make sense. We are seeking legislation for termination liability coverage and we will have to contract artfully for future services to make this approach work.

I also want to make it clear that if we are not successful, we will have to come back to seek the appropriate budget adjustments.

The past really is prologue. We have worked extremely hard for the past 3 years. We have made real progress in returning the Shuttle to flight status, beginning an epic era of space science launches. The space station contract effort is entering full-scale development. Our science and aeronautics and technology efforts have developed dynamic momentum.

The challenge for NASA, the administration, the Congress, and the American people is to keep this integrated program on track and focused on our clear national strategy and our long-range goals. Let me underline once again what has been proven over and over again. If we aren't willing to commit the energy and the will and the money that this program requires, we aren't going to succeed. You can't have a first-class program by investing second-class resources. And it is national investment that's at stake here. Investment in humanity's future and America's right to influence and guide that future. We do not want to fall short of the expectations of the nation we all serve.

Thank you very much.

[The statement follows:]

STATEMENT OF DALE D. MYERS

Madam Chair and Distinguished Members of the Subcommittee:

I welcome this opportunity to discuss the FY 1990 budget request for NASA as submitted by President Reagan.

Overview

With the help of this Committee, as well as the other Committees that review our budget and the Congress as a whole, the Nation's space program is making a strong recovery. The shuttle is flying again, the replacement orbiter is well into production, and the space station is under development. A number of key science missions are about to fly. And the mixed fleet is a reality. In short, the space program is back on track. The challenge now for us in NASA, for the new Administration, and for you on Capitol Hill, is to keep it on track to sustain and build on the forward momentum toward our long-range goals in space.

We have had three successful shuttle flights. We still have many flights to go to reestablish full confidence, demonstrate reliability, and work off the backlog of scientific and national defense missions.

We have made a strong beginning with the Space Station Freedom Program. We have Congressional approval, we have a firm configuration, contractors have been selected and are at work, and formal agreements with our international partners are in place . And now, the real work of design, development and testing has begun.

Our science programs are in good shape, with several major projects awaiting their turn for a shuttle launch. The FY 1990 budget continues to provide strong support for space science.

Our studies toward the long-term goal of expansion of human presence and activity into the solar system are progressing, but we still have much to do before we fully understand the potential options, benefits and costs.

We are on the track laid out in the national space policy and in the FY 1989 budget. Your support - the actions of Congress last year - made it possible for us to move ahead without major programmatic changes. This FY 1990 budget request includes $13.3 billion for NASA, approximately $1.8 billion more than last year's request and $2.4 billion more than the FY 1989 appropriation. This is slightly less than the amount forecast a year ago when we presented the FY 1989 budget to you.

Virtually all of this increase is needed for programs presented and approved last year:

- the step by step build-up of space shuttle flight rate and development of the Advanced Solid Rocket Motor;
- the continued development of the space station;
- the Science and Applications, Aeronautics and Space Technology programs; and
- the necessary supporting activities

The fact that President Bush approved this substantial increase in NASA's budget is strong testimony to the validity of the need and to the national importance of NASA's programs in space and aeronautics and the technologies they develop. In looking at the details, you will see the FY 1990 budget of $13.3 billion affirms this strong support for the space shuttle, the space station, space science and technology and aeronautics.

Let me highlight some of the key areas of this budget:

Space Transportation

Space Transportation activities - including the shuttle, upper stages, expendable launch services, spacelab and payload operations and related activities - will require nearly $4.7 billion in FY 1990. Our top priority goes to steady, long-term recovery and return of the shuttle to safe and reliable flight.

In the space shuttle, we have the world's most advanced system for getting people and payloads to and from Earth orbit, for carrying out U.S. scientific research in space, for stimulating commercial ventures, and for accomplishing many tasks in orbit, such as retrieval and repair of satellites, that cannot be done any other way. We sometimes forget the exciting and important missions already accomplished using the shuttle - the launch of major communications satellites, on-orbit repair of the Solar Maximum spacecraft, retrieval of defective spacecraft, and four major Spacelab missions. Indeed, these sophisticated missions are a testament to how much has been accomplished by the shuttle on 27 successful flights. At the same time, we must remember that this remains a complex developmental vehicle which will continue to require an extraordinary level of care and attention.

NASA's return-to-flight effort paid off with two successful flights in 1988 and one already in 1989. With the successful launch of the third TDRSS on March 13, 1989, we now have three operating tracking and data relay satellites in orbit which greatly enhances our orbital communications capabilities. More than 60 shuttle missions are planned through 1994. Five shuttle flights are scheduled for FY 1989, followed by nine flights in FY 1990. The mission plan includes:

- the Magellan mapping mission to Venus, scheduled for launch in the near future;
- the Galileo mission to explore the Jupiter system in October;
- the retrieval of the Long-Duration Exposure Facility;
- the Hubble Space Telescope, the first of the Great Observatories in Space; and,
- the next Spacelab mission which will be devoted to life sciences will fly in June 1990.

These missions scheduled during the next two years are just the beginning. For example, the longer term flight plan involves 23 Spacelab missions and many more missions important to science and to our national security.

The shuttle is the fundamental link in a space transportation infrastructure which will carry this Nation into the 21st century. It is our means to place human beings into orbit and it makes the Space Station Freedom possible and practical.

The FY 1990 budget provides the funding necessary for shuttle operations to support the planned missions and to proceed with the development of the Advanced Solid Rocket Motor to enhance the safety, reliability and performance of the shuttle. It provides funding for expendable launch services for scientific and operational payloads including the Global Geospace Science missions and the Mars Observer. In addition, the budget provides for the related Space Transportation Capability Development activities detailed in our budget request.

Space Station Freedom

The budget provides over $2 billion to continue the planned build-up in funding for the development of the space station. The bulk of this funding will go to the four principal (work package) contractors to support detailed design activities. The development plan and basic configuration are firm, and the development contractors are making substantial progress. We are moving toward a first-element launch in early 1995 with a capability for man-tended research activity by the end of that year and a permanently manned capability by the end of 1996. Our international partners are committed, investing their resources and working on schedules consistent with this plan and with the agreements approved last fall.

Space Station Freedom is the best space station to meet our national objectives in Earth orbit and to support our long-term goals of expanding human presence and activity into the solar system. The space station is of the highest importance to the future of the civil space program.

In simple terms, Space Station Freedom is:

-- for science and technology,

a permanently manned research laboratory in space - where advanced research equipment and human intelligence can interact on the spot, where we can learn about the Earth's changing environment, and a place to learn about long-term human activity in space;

-- for human exploration of space,

a gateway for integration, test and departure for potential future missions; for human exploration of the solar system, all roads will pass through Space Station Freedom; and,

-- for international cooperation,

a clear, visible symbol of our commitment to peaceful leadership as a space-faring nation and of our readiness to cooperate with other nations in this great adventure.

Space Station Freedom is clearly the next step in the involvement of human presence, human intelligence and, most importantly, the human spirit, in the exploration and utilization of space. That is why it is so important that we move ahead with development of Space Station Freedom. Other nations have certainly recognized the extraordinary value of the experience of a permanent human presence in space; the Soviets assuredly have acknowledged it and have already committed major resources to bring it to fruition. Without the space station, this Nation would need to reexamine fundamentally its goals and objectives for the civil space program.

Mr. Chairman, actions have been under consideration in the Congress which would substantially reduce the FY 1989 funding for Space Station Freedom. This is unacceptable. The Space Station is one of the highest priorities of the President. In fact, the President has indicated definitively in his budget message that he intends that NASA proceed to spend the remaining $515 million of FY 1989 funding as soon as it is available, i.e. May 15, 1989. We trust that this Committee will continue to support the Space Station Freedom program as it has in the past.

Space Science and Applications

Nearly $2.0 billion of the budget request for FY 1990 is planned for the Research and Development activities managed by the Office of Space Science and Applications. These important activities are, of course, directly supported by other elements of the NASA program - particularly Space Transportation and Tracking and Data Acquisition.

For more than 20 years, the Space Science program has been extending our vision and expanding our understanding of the solar system, the galaxy and the universe, and it has given us a new way of looking at and understanding the Earth. Only from space can we observe the Earth on a global basis.

The Science program is on the verge of a new era with the resumption of flight activity on both the shuttle and expendable launch vehicles. By the end of 1990, we will have launched the Magellan mission to Venus, the Galileo mission to Jupiter, and the Hubble Space Telescope, the first of the Great Observatories. In addition, we will have launched the Gamma Ray Observatory, the Cosmic Background Explorer, the ROSAT, and the Ulysses mission to look at previously unreachable areas of the sun. We will have flown an important Life Sciences Spacelab mission. We will be developing the mirror for the Advanced X-Ray Astrophysics Facility (AXAF) and instruments for the Global Geospace Science mission. The FY 1990 budget proposes initiation of the Mariner Mark II spacecraft missions (CRAF and CASSINI) to expand our knowledge of comets and of Saturn and its satellites. CRAF/CASSINI will study the material from which the solar system formed, the material from which life formed, and the chemistry which gave rise to that life. The FY 1990 budget also provides for NASA Life Sciences/life support activities that encompass the science and technology efforts essential to provide the medical, environmental, operational and EVA life support systems needed for NASA's future missions.

The Applications program applies space capabilities to the Earth and its environment, to materials processing, and to communications and information systems. More than $400 million is proposed in NASA's FY 1990 budget for spacecraft, instruments, research and analysis relating to our Earth's environment and climate. Development of the Upper Atmosphere Research Satellite will be nearly complete, and we will be well underway on our portion of the international TOPEX Poseidon ocean monitoring satellite. We will continue definition studies for the future initiation of the Earth Observing System. The proposed budget provides for continued development of new equipment and experiments to take advantage of the microgravity environment. The space station microgravity environment offers a unique promise for research and development in new materials, medicines, and processes which are beyond our present capabilities on Earth.

Aeronautics

For our Aeronautical Research and Technology program we are requesting $463 million in the Research and Development program. This may well be the portion of our budget that yields the highest early return.

Since the early days of aviation, the technology developed by NASA and its predecessor - the National Advisory Committee on Aeronautics - has been a major factor in the preeminence of this Nation in atmospheric flight - both in military aircraft and in civil transports. Today, the aircraft industry is the leading contributor to our balance of trade, providing a positive contribution and a favorable balance of $16.8 billion last year. Eighty-six out of every hundred civil transports in the world today were built in the United States. More than a million Americans earn their living in aeronautics. Clearly, our Nation is the world leader in aeronautics. We need to keep it that way.

Our FY 1990 budget covers a comprehensive program of aeronautical research and technology to:

-- enhance U.S. competitiveness in the international market place; and,

-- preserve our preeminence in aviation for the security of the Nation.

We will be focusing on technologies to enhance aviation safety, efficiency and performance across a broad range of vehicle applications. We will begin a new thrust in high-speed research with emphasis on the critical environmental issues of atmospheric impact, sonic boom and airport noise.

Our future place in world aviation depends on the research and technology work we do now.

Transatmospheric Research and Technology

The FY 1990 budget includes $127 million for NASA's share of the National Aero-Space Plane program effort to develop the technology to take us beyond present atmospheric flight capabilities into the realm of hypersonic, transatmospheric flight. NASA efforts are aimed at accelerating development of the critical materials, propulsion and control technologies which could enable a new class of vehicles in the future capable of flight to orbit as well as hypersonic flight between points on earth.

Space Technology

For FY 1990 we are requesting $338 million for Space Research and Technology Activities. It is now taken for granted that man can fly into space, conduct exciting missions, see deep into the universe, observe the Earth as a global system, and watch events around the world in real time on our television screens. A lot of hard work in space research and technology over many years has enabled these capabilities. But, continued focused effort is required to realize future possibilities -- not only in space, but also to maintain and expand the Nation's technological base.

We have drawn heavily from technology developed in the past. NASA is working on technologies for the future, but the many knowledgeable groups which have reviewed our program have been essentially unanimous -- we need to strengthen our efforts.

We are moving to do that:

-- NASA's basic program explores fundamental technology in newly emerging areas which offer promise of longer-range, high-leverage benefits.

-- The Civil Space Technology Initiative focuses on the technology needed to enhance our near-earth capabilities including automation and robotics, information systems, propulsion, power, and large structures in space.

-- The Pathfinder program is developing new technologies needed for potential robotic and piloted expansion into the solar system - major technology activities include surface exploration, in-space operations, humans in space, transfer vehicles, and mission studies. We are examining mission design options including possible use of the Moon as an observatory base or for using lunar resources at a Lunar base, or possible missions to Mars and its moons.

-- Finally, a new thrust is included to extend technology development to in-space experimentation using the shuttle and ELV's now and, later, the Space Station Freedom.

Space Operations

None of our space flight programs could meet their objectives without the availability of high quality, reliable space operations tracking and data support. Our FY 1990 budget includes $1.1 billion to assure that support now and in the future. The transition from a ground-based tracking network to a space-based system for low-Earth orbit missions is continuing with the check-out of the Tracking and Data Relay Satellite (TDRS) spacecraft that was launched in March. The budget continues this activity including replacement of the TDRS lost in the Challenger accident to ensure continuity of service through the mid-1990's. The budget includes procurement of equipment for a second TDRSS ground terminal which is critical in order to eliminate the present ground terminal as a single point of failure, and to provide the capability of operating more than two TDRS in orbit, as well as it being important to future system operations and reliability. The budget also provides for operations and improvements of the Deep Space Network to support the upcoming planetary missions.

Commercial Programs

The FY 1990 budget request includes $61 million for the activities of the Office of Commercial Programs. During 1988, agreements were completed to fly the Spacehab microgravity facility on the Space Shuttle and with the University Corporation for Atmospheric Research to use the Space Shuttle external tanks. NASA also signed launch support agreements with several expendable launch vehicle manufacturers. The FY 1990 budget provides for continued improvement of the Technology Utilization Network System which facilitates timely and effective communications among the Industrial Applications Centers, the Technology Counselors, and other NASA Technology Utilization offices. We plan to establish links with other networks in FY 1990. The budget emphasizes the development of ground facilities and equipment to expand the NASA technical research data base used by the private sector. The FY 1990 request also includes funding for support of sixteen Centers for the Commercial Development of Space.

Safety, Reliability, Maintainability, and Quality Assurance

The FY 1990 budget request of $23 million supports the aggressive implementation of the NASA Safety, Reliability, Maintainability, and Quality Assurance program. This effort will pursue the strengthening of the execution of NASA programs through continued introduction of systems to provide Agency-wide independent assessments, problem reporting, failure analyses, corrective actions, trend analyses, in-depth safety reviews, and nondestructive evaluations.

University Space Science and Technology Academic Program

This new budget line item of $35 million provides for continuation of Agency-wide university and minority university programs previously budgeted in other NASA programs. FY 1990 funding will support graduate and undergraduate student fellowships, faculty fellowships, the historically black colleges and university research program, other minority universities, and the Space Grant College and Fellowship program.

Private Sector Investment and Involvement

An important thrust of this Administration's policy and the FY 1990 budget is increasing the participation of the private sector in space -- not simply in performance of work, but in financing new activities and in accepting some of the risks, as well as sharing in the benefits. In accordance with the National Space Policy, the FY 1990 budget encourages greater private sector involvement in meeting the Nation's space goals. During the coming year, one of NASA's major efforts will be to seek increased private sector investment and involvement in space.

With respect to the planned space infrastructure, we have identified, as candidates for private investment, portions of the development of extended mission duration capabilities of the Shuttle; the development of solar dynamic power and a docking module for the Space Station, and future requirements for the Space Station, including those under study. The budget plan includes Government use of a commercially developed space facility (CDSF), with funding beginning in 1992. In ground-based facilities, the proposed budget includes seeking private financing for facilities for processing the space station, for neutral buoyancy training of space station astronauts, and for R&D on observational space instruments. NASA will develop specific procedures and criteria for commercial development of space-related systems including the space station and other manned space flight systems. The Space Station Flight Telerobotic Servicer (FTS) was also considered for private sector investment. However, we have now modified this approach after a further assessment of the project. NASA is proceeding with FTS development and contractor selection on the planned schedule.

Timely success in this endeavor is essential to allow the program to work within the proposed budget level; it is crucial that NASA be in the best position possible to explore private opportunities in a timely fashion, so these vital elements of the Space Station program and important Shuttle improvements can move ahead on schedule. We are hopeful that Congress will act quickly to consider NASA's proposed FY 1990 authorization bill, which addresses the issue of termination liability for private sector investment in these critical areas. There is also separate legislation pending before NASA's authorization Committees which would provide NASA with liability authority to support private financing for the ASRM facility.

NASA Capability

A major priority of the FY 1990 budget request is the continued assurance of the health and strength of the NASA institution, on which the Nation has relied so heavily for nearly thirty years. The FY 1990 budget proposes $341 million for Construction of Facilities and $2.032 billion for Research and Program Management. As you know, Research and Program Management funding provides for our civil service personnel - the researchers, scientists, engineers and managers - for their travel, and for the basic operation of the NASA institution. The key element in all NASA programs - past, present and future - is, in fact, our people. The budget proposals for 1988 and 1989 recognized the need to revitalize and invigorate the NASA workforce and facilities. The 1990 budget continues this thrust.

While I believe that NASA still has a superb work force, possibly the best ever assembled, the Agency must work constantly to keep it that way, with a focus on quality and on the needs of the future. We need to balance our experienced scientific and engineering work force through people with new ideas and concepts. The Nation's future in space and aeronautics depends on a dynamic, competent core technical capability at the NASA centers. At the same time, NASA must strengthen its management capabilities - the ability to deal effectively with highly complex program engineering and integration requirements involving activities throughout this country and abroad. In addition, NASA must provide appropriate facilities and equipment commensurate with our research and development objectives.

Therefore, the proposed FY 1990 budget reflects as a high priority the necessary funding for people and facilities. The Research and Program Management budget provides an increase of 700 people over FY 1989 level. NASA needs those people, and we intend to acquire the best people available to meet NASA's needs now and in the future. The Construction of Facilities budget request accommodates critical requirements supporting the Space Station Freedom program, necessary space flight improvements, advanced aeronautical research and the Aeronautical Facilities Revitalization Program.

Summary

In summary, the FY 1990 budget request approved by President Reagan proposes the following:

Research and Development	$ 5.752	billion
Space Flight Control and Data Communications	5.140	billion
Construction of Facilities	.342	billion
Research and Program Management	2.032	billion
Inspector General	.009	billion
TOTAL	$13.274	billion

I believe that this FY 1990 budget proposal reflects the fact that the space program is back on track. The content of NASA's program is solid, productive and exciting. I must caution you, however, that this is a very tight budget. NASA can only accomplish the objectives, and the programs outlined, if it has full support all the way through the process. We are prepared to give it our best shot -- and we are counting on the support of the Administration, the public, and especially the Congress.

BUDGET REQUEST

Senator **Mikulski**. Thank you, Mr. Myers, for those comments.

Dr. Hinners, I didn't know you were leaving as well. We know each other from Goddard days and so on, and so we want to thank you. We'll be talking with you before tomorrow is over.

Let's get right into the questions, though. We're going to go kind of 10 minutes, 10 minutes, and then back to 5, 5, and 5 if that's OK. My questions go to the original OMB request so that we have a sense of the direction you wanted to take it and if you were unfettered from budget constraints.

At the very top of every agency's concern this year, of course, is funding. Your request is 22 percent over last year's level, about $2.6 billion, making it $13.3 billion. What did NASA originally request for 1990?

Mr. **Myers**. We requested a little over $14 billion; $14.4 billion was the exact number.

Senator **Mikulski**. You asked for $14.4 billion; is that correct?

Mr. **Myers**. Yes.

Senator **Mikulski**. Could you provide for the record a table that shows the difference between the President's request and what you originally proposed, and then what OMB recommended?

Mr. **Myers**. Yes. We'll be happy to do that.

[The information follows:]

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
FY 1990 BUDGET SUMMARY
(Millions of Dollars)

	FY 1989	FY 1990 OMB REQUEST	△	FY 1990 CONG REQUEST	
RESEARCH AND DEVELOPMENT	4266.6	6178.5	-426.9	5751.6	
Space Station	900.0	2130.2	-80.0	2050.2	Private investment of FTS -30M/general reduction -50M
Space Transportation Capability Development	681.0	677.0	-38.0	639.0	
Spacelab	88.6	98.9	0.0	98.9	
Upper Stages	138.8	106.7	-18.1	88.6	Delete ACTS upper stage -6M/cancel IUS mod kit -12M
Engineering & Technical Base	155.4	201.0	-11.2	189.8	General reduction
Payload Operations & Support Equipment	64.7	84.8	-3.7	81.1	Private investment for Docking Module
Advanced Programs	52.7	48.7	0.0	48.7	
Tethered Satellite System	26.4	19.9	0.0	19.9	
Orbital Maneuvering Vehicle	73.0	107.0	0.0	107.0	
Advanced Launch System	81.4	10.0	-5.0	5.0	General reduction
Space Science & Applications	1830.2	2136.2	-140.9	1995.3	
Physics and Astronomy	734.1	949.1	-54.6	894.5	
Hubble Space Telescope Development	95.9	67.0	0.0	67.0	
Gamma Ray Observatory Development	41.9	26.7	0.0	26.7	
Advanced X-Ray Astrophysics Facility	16.0	44.0	0.0	44.0	
Global Geospace Science	64.4	112.3	0.0	112.3	
Payload & Instrument Development	81.7	116.3	-44.9	71.4	Cancel GP-B -25M/CRRES ELV Man -15M/gen p/l spt -5M
Shuttle/Spacelab Payload Mission Management & Integration	69.7	95.8	-9.7	86.1	Delete institutional lab equip
Space Station Integrated Planning & Attached Payloads	8.0	23.0	0.0	23.0	
Explorer Development	82.1	93.2	0.0	93.2	
Mission Operation & Data Analysis	143.2	204.8	0.0	204.8	
Research & Analysis	85.8	112.5	0.0	112.5	
Suborbital Program	45.4	53.5	0.0	53.5	
Life Sciences	78.1	124.2	0.0	124.2	
Human Space Flight & Systems Engineering	27.6	42.8	0.0	42.8	
Space Biological Sciences	10.1	27.6	0.0	27.6	
Research & Analysis	40.4	53.8	0.0	53.8	
Planetary Exploration	416.6	406.9	-10.0	396.9	
Galileo Development	73.4	17.4	0.0	17.4	
Ulysses Development	10.3	14.5	0.0	14.5	
Magellan Development	43.1				
Mars Observer	102.2	100.5	0.0	100.5	
Comet Rendezvous Asteroid Flyby/Cassini		40.0	-10.0	30.0	General reduction
Mission Operations & Data Analysis	110.7	155.4	0.0	155.4	
Research & Analysis	76.9	79.1	0.0	79.1	

	FY 1989	FY 1990 OMB REQUEST	△	FY 1990 CONG REQUEST	
Space Applications	601.4	656.0	-76.3	579.7	
Earth Sciences	413.7	444.3	-10.0	434.3	
Upper Atmosphere Research Satellite	94.2	73.9	0.0	73.9	
Ocean Topography Experiment	83.0	72.8	0.0	72.8	
Scatterometer	10.6	13.8	0.0	13.8	
Earth Probe		10.0	-10.0		Delete TOMS instrument
Earth Science Payload Instrument Development	46.4	66.5	0.0	66.5	
Airborne Science & Applications	23.0	19.7	0.0	19.7	
Geodynamics	32.9	38.0	0.0	38.0	
Missions Operations & Data Analysis	17.6	24.8	0.0	24.8	
Research & Analysis	106.0	124.8	0.0	124.8	
Materials Processing	75.6	92.7	0.0	92.7	
Space Communications	92.2	84.9	-66.3	18.6	Terminate ACTS
Information Systems	19.9	34.1	0.0	34.1	
Commercial Programs	44.7	67.0	-6.0	61.0	
Technology Utilization	16.5	26.7	-4.0	22.7	Delete NTTC
Commercial Use of Space	28.2	40.3	-2.0	38.3	Delete CCDS aug
Aeronautical Research & Technology	404.2	512.8	-50.0	462.8	
Research & Technology Base	315.6	368.7	-33.0	335.7	High computing cap -18M/Subsonic -15M
Systems Technology Programs	88.6	144.1	-17.0	127.1	
(Materials & Structures Systems Technology)	(19.2)	(30.3)		(30.3)	
(Rotorcraft Systems Technology)	(4.8)	(14.9)	(-10.0)	(4.9)	Tiltrotor aug
(High-Performance Aircraft Systems Technology)	(11.0)	(34.9)		(34.9)	
(Advanced Propulsion Systems Technology)	(13.9)	(21.5)	(-7.0)	(14.5)	Ultra High Bypass (Subsonic)
(Numerical Aerodynamic Simulation)	(39.7)	(42.5)		(42.5)	
Space Research & Technology	295.9	437.2	-99.1	338.1	
Research & Technology Base	134.1	140.2	-10.1	130.1	Delete Institutional Lab Equip Aug
Civil Space Technology Initiative	121.8	169.5	-25.0	144.5	Slow build-up
(Propulsion)	(36.1)	(51.4)	(-14.0)	(37.4)	
(Vehicle)	(13.3)	(39.0)	(-3.0)	(36.0)	
(Information Technology)	(15.9)	(17.5)	(-1.9)	(15.6)	
(Large Structures & Control)	(19.5)	(23.9)	(-5.0)	(18.9)	
(Power)	(11.1)	(11.1)	(-.4)	(10.7)	
(Automation & Robotics)	(25.9)	(26.6)	(-.7)	(25.9)	
Pathfinder Program	40.0	97.5	-50.2	47.3	Slow build-up
(Surface Exploration)	(8.5)	(19.5)	(-10.2)	(9.3)	
(In-Space Operations)	(15.0)	(27.0)	(-11.4)	(15.6)	
(Humans in Space)	(6.0)	(14.0)	(-7.7)	(6.3)	
(Space Transfer)	(5.5)	(12.0)	(-5.9)	(6.1)	
(Mission Studies)	(5.0)	(25.0)	(-15.0)	(10.0)	
In-Space Flight Experiments		30.0	-13.8	16.2	General program reduction

	FY 1989	FY 1990 OMB REQUEST	Δ	FY 1990 CONG REQUEST	
Transatmospheric Research & Technology	69.4	127.0	0.0	127.0	
Safety, Reliability & Quality Assurance	22.4	33.3	-10.0	23.3	General program reduction
University Space Science & Technology Academic Program	(22.3)	37.9	-2.9	35.0	General program reduction
Tracking & Data Advanced Systems	18.8	19.9	0.0	19.9	
SPACE FLIGHT, CONTROL & DATA COMMUNICATIONS	4464.2	5542.7	-403.1	5139.6	
Shuttle Production & Capability Development	1128.2	1424.6	-119.3	1305.3	Delay structural spares -50M, private invests EDO -27M, Reduce change allowance -42M
Orbiter Operational Capability	281.8	321.7	-84.7	237.0	
Propulsion Systems	582.2	753.8	-26.5	727.3	
Launch & Mission Support	264.2	349.1	-8.1	341.0	
Space Shuttle Operations	2305.2	2606.4	-43.7	2562.7	Cancel/defer flight in FY 90 & 91
Flight Operations	685.7	777.6	-5.0	772.6	
Flight Hardware	1112.7	1266.2	-29.7	1236.5	
Launch & Landing Operations	506.8	562.6	-9.0	553.6	
Expendable Launch Vehicles	85.5	298.0	-128.5	169.5	Cancel Plane[illegible]y Backup
Space & Ground Networks, Communications & Data Systems	945.3	1213.7	-111.6	1102.1	
Space Network	483.9	651.3	-69.0	582.3	TDRS Replacement -25M/STGT -25M/Adv TDRS -6M/Man Spt -13M
Ground Network	228.1	296.7	-27.1	269.6	DSN X-Band Uplink -10M/Station Extensions -8M/Man Spt -9M
Communications & Data Systems	233.3	265.7	-15.5	250.2	CDOS Rephase -10M/Spacelab Data Processing Data Deliveries -6M
CONSTRUCTION OF FACILITIES	275.1	509.9	-168.1	341.8	Privitize ASRM -60M, NBL -30M, Space Station Proc Fac -43M, Observational Inst Lab -14M, general reduction -21M
RESEARCH & PROGRAM MANAGEMENT	1891.6	2141.8	-109.6	2032.2	Absorb pay raise & health benefits (54M), delete augmentations and reduce level of support
INSPECTOR GENERAL	(8.6)	8.8	0.0	8.8	
TOTAL	10897.5	14381.7	-1107.7	13274.0	

BUDGET REDUCTIONS

Senator **Mikulski**. Mr. Myers—and, of course, call upon anyone else you'd like to jump in—what are the top five or six items which were deleted by OMB which you think are essential for NASA to maintain its core program?

Mr. **Myers**. I'd like to call on Tommy Campbell to cover those items and then I will make comments on them.

Mr. **Campbell**. Yes, Senator Mikulski. We lost several major flight programs: The advanced communication technology satellite program was deleted from the budget; we lost the gravity probe B, actually the shuttle test of relativity experiment; and we lost the total ozone mapping spectrometer instrument that was in the Earth probe's budget line that we wanted to initiate this year.

The structural spares on the shuttle were deployed which was a major item that we had counted on very strongly. It was actually deferred into the next year. We had some substantial reductions in the tracking area where we needed some bolstering of the infrastructure. We had significant reductions in our institutional area, in the R&PM appropriation which funds our personnel and the institutional support at the centers.

In addition, there was about $200 million that was removed from our budget largely in the facilities area, but also in two flight areas. In addition to the flight telerobotic servicer that has been reinstated in the budget, although we are absorbing it, the extended duration orbiter was adjusted by about $25 million in pursuit of some privatization activity. The docking module, which will be a later major development, was also adjusted in the amount of about $4 million. Those were the major adjustments that took place.

Now, we did lose some substantial funding that we had requested in the Pathfinder Program, which is a technology initiative, initiated last year in the fiscal year 1989 budget, and also in the CSTI program which is another major technology research initiative we have underway. We took substantial reductions in both those areas which slowed the pace of technology substantially below what we had planned and what we feel we need.

SPACE TRANSPORTATION BUDGET REQUEST

Senator **Mikulski**. Thank you very much, Mr. Campbell. We'll look forward to this chart, which I am sure is going to be elaborated on.

I am concerned as I listen to what I hear about space spare parts and core, I mean the basics, the nuts and bolts. If I could turn a minute to you, Admiral Truly, because I'd like to turn to NASA's basic infrastructure, one policy, the other funding. When we were on tour and we were down in Huntsville, AL, one of the things that we talked about, that in order to go into space, you needed a basic NASA infrastructure, essentially the NASA core and the nuts and bolts.

I'm sure you've had a chance to review this budget— and it's a joint budget between the Acting Administrator and yourself—from your reading of the budget and, of course, what you yourself would administer, in terms of the basic NASA core that is a must do list in order for you to have the infrastructure to do space science, probes, and space shuttle, or all those other things, what has been left out, or do you have sufficient funds to organize, maintain, operate, do the proper maintenance, have the spare parts, essentially the infrastructure needs, do you have the money to do that or do you need more money, and in what areas would money be required?

Admiral TRULY. Madam Chairman, certainly I will restrict my comments on this budget to my area of responsibility, the Office of Space Flight.

SPACE FACILITIES

Senator MIKULSKI. OK, fine. Do that, sir, because the space facilities are under your management and we consider that NASA's core.

Admiral TRULY. My view of the 1990 budget is that it is absolutely, on the margin of being too tight when you come down to the basic infrastructure in space transportation. In the process of adjusting our budget from the original request of $14.4 to the President's request of $13.3, we went into the shuttle program, the expendable launch vehicle, that is the mixed fleet program, and the upper stage program and found every last dollar that we could.

I kept an absolute mark in the sand that we were not going to back away from the safety enhancements that we had put into the program. We were not going to fly more flights than we had the resources to fly in the manner that we are presently doing. There is always going to be risk in the program and we understand that, but we did not back down from the safety issues.

However, let me point out that the squeeze for dollars was so tight that in this 1990 budget we actually took a flight out. We went that far into the budget and removed a flight in order to save the marginal cost of the rockets and tanks and propellants needed to maintain that flight in the budget. I realize on the Hill that the NASA budget does stand out like a sore thumb. It includes an increase and a very visible one. Yet inside the Office of Space Flight programs, I don't think I've ever seen it tighter.

We believe that the month-by-month and the year-by-year logistics for the space shuttle program is safety itself. Even though we have squeezed, we have squeezed it so that it will be as small as it can, I am absolutely convinced that what we have put into the shuttle logistics is adequate. However, in the structural spares program, as was earlier mentioned, we had no choice but to delete some of those dollars. That frankly, in my personal opinion, is mortgaging the future of the potentially most economical way to continue in space flight: The evolution of the infrastructure and the systems that we have.

So I don't know how to be more explicit, other than to say that at least in my corner of this budget, I believe we have gone to the bottom line.

Senator MIKULSKI. It's not only a corner. The operation of the space facilities is probably two legs of the triad without that core.

Admiral TRULY. It's certainly true that one of the fun parts of my job in space transportation is that every satellite, every mission, every man, every woman that flies in space on a NASA program comes through us. So our ability to fly in space is based on our infrastructure, our people, our good facilities for them to work in, our ability to keep the people, the logistics, the spares, the shuttles, and so forth.

I feel that we can safely operate at the levels of this budget for the flight rate we have in 1990 but there is very little margin in it.

Mr. **Myers**. Madam Chairman.

Senator **Mikulski**. OK, because I know we are going to turn to Senator Garn. Did you want to finish, Mr. Myers?

Mr. **Myers**. I just wanted to make the point that this very tight position we have in space transportation covers not only the Shuttle but also the expendable launch vehicles that go with that program. We are also extremely tight in our aeronautics program and in our science program. We may be able to discuss that later.

Senator **Mikulski**. Senator Garn.

AERONAUTICS PROGRAM

Senator **Garn**. Dale, if you would like to follow up on that, certainly a lot of people don't realize that it's the National Aeronautics and Space Administration. They forget the first "A" and there's a lot of things that happen there over the years, from super critical wings to high bypass engines that are important to civil aviation. So if you would like to finish that part, please go ahead.

Mr. **Myers**. Thank you, Senator Garn.

We cut back in our aeronautics program, too. Let me set a little bit of a stage here. After the *Challenger* accident, the whole of NASA put the focus on rebuilding the shuttle program. Along with that, Jim Fletcher and I recognized that to a degree, we were neglecting the core technologies and the basic work that's involved in keeping our Nation ahead of the rest of the world in aeronautical programs.

Jim and I felt that it's very important to back up the aeronautics base we have. That's a core capability in NASA that is vital to the commercial advantages we have in balance of trade and in the aeronautical research we do with industry that leads to not only commercial transports but for help to our military programs. We had to cut in that area, too.

One place that really hurt was the cutback in the basic space technology area. Part of the overall strategy at NASA was to rebuild our technology base in space for such things as aero-assisted reentry into the atmosphere, and the generation of oxygen and water from planetary materials. All of those programs were cut very dramatically in our negotiation with the OMB and that means a reduction in the kind of technologies that really set the future in place.

For example, when I came back to NASA in 1986, I found that we had almost no technology developing in new liquid rocket engines and the programs there had languished over a long period of time.

The summary of our position is that coming out of the *Challenger* recovery, we are increasing the number of flights on the shuttle in 1990. We are entering an epic era of space science in the preparation of science payloads and the building of the inner structures for attaching science payloads to either the shuttle or expendable launch vehicles. All of that has added money to the program. The increases, although they all were approved last year—except for 1 percent—are increases that clearly come as a result of NASA's getting back on its feet again and recovering our position of leadership in the world.

I think we really went through a painful experience in reducing our budgets to the $13.3 billion level that we are proposing. We recognize it was an increase over the previous year, but we also recognize that each one of the elements is a key to the leadership of the United States in the world, and in competitiveness and productivity.

Senator GARN. Mr. Myers, something that is really overlooked in the budget request and the increases is the enormous amount of money that was spent to get back flying again after the *Challenger* accident. I don't think most people understand in the Congress that effort, and I would liken it to a situation—let's talk about HUD. That's another part of this subcommittee. It's no different than if you had had a certain amount of money allocated for new housing, new programs, new low-income housing, subsidized housing, and so on. And on the Gulf coast, suppose you had a gigantic hurricane that wiped out a lot of existing housing, and so you had to take the money that was for the future and replace those houses that we lost.

That is what has happened to NASA's budget. If we had continued on in the normal progression, NASA's budgets were tight enough that a lot of areas of science that don't get a great deal of attention or aeronautics would be short-changed anyway. And then you put the impact of the *Challenger* wiping out those houses, to compare it to that, so an enormous amount of resources went into that, rather than these other programs and continuing on with future development. People don't realize that.

That's why, when we tried to find out a way to find the fourth orbiter—and I still have Department of Defense mad at me, but I could care less—there was no way that NASA could fund the replacement orbiter, so I just happened to find a little old $2 billion over there in defense that they're still screaming about, but they won't miss it too much. So I think that's another aspect we have to look at.

Admiral Truly, if my analysis of the Budget Committee's actions is correct, tell us what you think a $1 billion reduction in the budget we're just talking about would do. Is that elimination of the Space Station, as I think it is?

Admiral TRULY. Senator, I know that the day is going to come shortly when I have to take on that question very, very seriously. I believe a $1 billion reduction would mean either a cancellation or certainly a total restructuring of the space station or, further, a restructuring of NASA.

As I said, this budget for the Office of Space Flight, which I do know a lot about since I've fought with the others to build it and then refought it as it was squeezed tighter, can stand essentially no reduction unless we're going to back away significantly from flying in space. My part of the budget is to fly shuttle flights, and it's not just to fly shuttle flights for their sake, but because on those shuttle flights are important science missions and national security missions that we've committed to. The only way to get significant dollars out of my corner of the budget is either to back away from safety commitments, which I refuse to do, or to back away from flying.

If I project this to the other parts of NASA, to aeronautics or to science and technology, even though those are not my area of responsibility, I know they have been squeezed, too. A billion dollar cut out of this budget is going to require some very, very painful choices by the people in NASA and by the various parts of the Congress who expect NASA to be part of America's future and leadership.

Senator GARN. Obviously, you would keep space flight whole and, as Mr. Myers mentioned, the entire aeronautics budget is $900 million, so you could—nobody would want to do it—you could totally eliminate NASA from the aeronautics business.

I just want to illustrate the type of choices that would have to be made if that kind of choice came about, and none of them are pleasant.

Let me proceed, before my time is up on this first round, to looking at——

Senator MIKULSKI. You have more than 5 minutes, Senator.

ADVANCED SOLID ROCKET MOTOR

Senator GARN. Thank you.

Look at the advanced solid rocket motor. I think both of you know of my opposition to Government-owned facilities, not just for an advanced solid rocket motor, but in general. I have not been too pleased with Government ownership. But I am also concerned about the recent release of NASA's Aerospace Safety Advisory Panel which questioned claims of increased safety and reliability of the ASRM and recommended development of the booster motor be postponed pending further study of alternatives.

We've gone through several generations now of the current solid rocket motor, and with the change in the O-rings and the redesign, certainly I think there's great confidence that it's much safer than it used to be. But we're talking about an ASRM, and your own Safety Advisory Panel is questioning that. So what is your response to that report?

Mr. MYERS. Senator Garn, we've been through that report very carefully. Unfortunately, at the time the report came out, we were still in the Source Evaluation Board activities on the selection of the contractor for the SRM. Now that selection has been made, we are able to describe more fully the ASRM program and its advantages.

The ASAP, the Aerospace Safety Advisory Panel, looked at the ASRM from a safety standpoint only. They looked at it from the standpoint of saying in a development program of this nature we have a much safer redesigned solid rocket motor than we have had previously, but we still believe there are things that could be done that will improve the safety and reliability of the system even further.

Their argument was that it will take time for the learning curve on reliability to come up to speed on the ASRM. Our argument is that we've learned a tremendous amount from the redesigned solid rocket motor, the work that's been done in looking at automation of the devices involved, and in the fundamental design that allows, for example, these joints to close when they are pressurized. That comes into the ASRM.

But, more than that, we get performance out of the system, too. I think that the performance will pay off in a whole series of cost-effective improvements of shuttle activities.

I would like to call on Admiral Truly to speak further to this because he has been deeply involved in the ASRM program.

Admiral **Truly**. Thank you.

We have been working closely with the ASAP committee, the Aerospace Safety Advisory Committee. As a matter of fact, I was on the phone yesterday talking to one of their members and trying to arrange to make available to them some of the details of the winning design that we were unable to talk about until the Source Evaluation Board was complete.

Mr. Myers mentioned the advantage in performance. As you know, the goal for the advanced solid rocket motor is 12,000 pounds in additional performance.The winning proposal, prior to the start of development, has about a 2,400-pound margin above that 12,000 pounds in the design. Assuming that as usually happens in development programs when the realities of the development and weight increases and so forth happen, we think we have an excellent opportunity to gain performance increases of about 17 percent on every shuttle flight that flies.

In recently looking over the history of our using shuttle performance on the flights we have flown, we have been able to use it extremely effectively in a system like the space shuttle; for example, taking the Hubble Space Telescope to a higher altitude, or taking science missions that want to go to a higher inclination or to carry heavier payloads.

On balance, and in looking at the advanced solid rocket motor, where our objectives are increased competition, increased safety and reliability, and increased performance, and taking the views of the ASAP committee in the light that they were given, I believe the program is on very solid footing and ready to move ahead.

Senator **Garn**. Thank you. I would just add that this is an important issue and obviously there isn't enough time with all the other things we have to cover. I would suggest that it would be worth considering a separate hearing at some time in the future just on this issue so we can talk about it in a great more detail.

I would also put in one last disclaimer. I thought these kinds of charges had left, but as late as Friday I was accused on a talk show of being the Senator from Morton Thiokol and personally responsible for the *Challenger* accident because I got the contract for Morton Thiokol for the SRB's that failed. So once more for the record, I would simply state that the contract was given 2 years before I became a Senator. Other than that, I have no defense against the charge. Thank you.

Senator **Mikulski**. Thank you, Senator Garn.

Senator Gramm.

SOVIET'S SPACE PROGRAM

Senator **Gramm**. Thank you, Madam Chairman.

One of the reasons we had such a clear focus of attention by the general public on the space program in the 1960's was the success that the Soviets had in putting up the first satellite. I remember the day vividly. You know, you look back at your life, at the things you remember; I remember that day. It was a shocking experience to most Americans to think that we had allowed the Soviet Union to surpass us in the area of space and science, with the potential impact that that had on national security, quite aside from the whole national pride issue.

President Kennedy seized on that by defining a mission that everybody understood, which was to put a man on the Moon. Clearly, one of our problems in creating this inspirational movement that was discussed in our opening comments has been a failure to be able to replicate that. That was in a quite different era in terms of budget as well, I might note. Today it is not sufficient to generate support for the space program; you have to create support and a willingness to fund it relative to something else, which is a much higher standard and a relatively new standard for setting priorities within the Federal budget.

Let me begin with an issue which I think has some relevance to those points, and that is what have the Russians been doing while we have been trying to get our space program restarted? I'm proud of the progress we've made since the *Challenger* tragedy.

Paradoxically enough, I was there when we had the memorial service at the Johnson Space Center. It was a very moving experience. I was at the Johnson Space Center on Sunday. I brought back memories of it, and I thought to myself that day that public support for the space program had never been stronger. Little could I have anticipated that the President's budget would be reduced substantially in the year that followed that.

But I'd like to at least get Mr. Myers and Admiral Truly to sort of comment on what have the Soviets been doing during this period that we have been trying to get the shuttle flying again. What are they doing in these long periods of sustained deep space flight? What progress do we see that they are making, and how good is our data on what the Soviets are doing?

Mr. **Myers**. Senator Gramm, the Russians have been very busy during this period of our recovery from the *Challenger* accident. They have had, over a long period of time, a strategy which appears to take the high ground. Their program has always moved in the direction of a manned space station. First they had Salyut, which was quite small and could only be visited occasionally. Then they put up Mir which, in English, is the word "peace," and which has been active now since 1986. It is fully manned and has been doing many of the things that we are specifically interested in with our space station.

They have been working with us now in some limited cooperative programs and have provided limited exchanges of data concerning their experience with long duration man in space. They are interested in the work that we had developed under our skylab program. They have clearly, in my mind, a direction that calls for long duration man in space, cooperative programs with other developing nations of the world to lead them to a sense of pride in activities with the Russians, a very strong program with Europe to include European instruments in their scientific probes, planetary probes and so on, and I think in general a continuous generation of a feeling in the world of their position of leadership in this activity.

They have also advertised very strongly an aggressive science program, with an emphasis on Mars, and they will be moving in the 1994 time period into other Mars programs. By 1998, I believe their plan is to bring samples back from Mars to Earth on an unmanned system. So they've advertised a very strong and aggressive continuing science program.

Along with this, they have also been very aggressive in developing launch vehicles, expendable launch vehicles, and a very close copy of our shuttle. They have built a heavy lift launch vehicle of the class that we would have if we built the Shuttle C, which is not in our budget. They have built a shuttle. They have built a continuous set of new launch vehicles. They have an extremely aggressive space program that has a logic similar to the logic and strategy we have, only obviously it has been, in my view, much better funded.

Admiral Truly might want to add something to that in his view of where the Russians are.

Admiral TRULY. I think you said it just right. In the last few years they have been relentlessly following the pattern that they have followed for many years, and that is to fly in space, to develop new vehicles. They have a space shuttle that has flown, it looks very much like ours. They have a heavy lift launch vehicle for which we have no match or no development program in this Nation even underway, and a stable of expendable launch vehicles that has been flying for many years.

They have had some setbacks recently, and I've read in the newspaper that it's been attributed to the economic times in the Soviet Union and that they might even be backing away from space flight. I don't own any stock in their program, but if I did I wouldn't sell it. I don't think they're going to back away from the space program because I think the Soviet Union quite clearly recognizes that it is one of the things in which they have been clearly a leader. It is a national goal, and I don't think you're going to see them changing.

The world has changed since that day Sputnik flew, and I also remember it vividly. But today the international competition in the space business is very, very intense.

Senator GRAMM. They did us a great favor that day. I wish they would replicate it.

Have you got any thoughts as to why they went through that period where they took people out of their space station?

Mr. MYERS. They have said that they have two more modules that they're going to put up to Mir, coming up in the August-September time period. Those vehicles are what appear to be a natural expansion of their space station over a long period of time. They will be large modules. They will be of the same size as the modules that are up there now, probably doubling the volume of the program.

They have said that they were withdrawing their crew from the space station because those vehicles were behind schedule a little bit, and they think that it's time to bring those men up again when they bring up those new devices.

That seems to me like a fairly logical explanation, that if they had a program that had planned for those modules to come up now, and they are a few months late, there is a rationale to bring their crews down and put them up again when they have the new experiments that go with those new modules.

Senator **Gramm**. Let me conclude with one sort of—I'm sure the answer will be somewhat lengthy—question about this criticism of a lack of focus of the space program. It is clear that the American people like a mission they can understand, an objective that is easily definable, that can be put on a bumper sticker. I mean in politics we're all trying to find simple ways of expressing a powerful idea—the Moon in the 1960's—or whatever.

I'd like to again hear you and Admiral Truly give us your response to this criticism that there is a loss of focus, a lack of a clearly-defined objective in the space program, perhaps too much of an emphasis—sometimes I hear this thing—too much of an emphasis on manned space flight. I guess I attribute a lot of the criticism to just simple competition for the money.

But I'd like to hear your answer. Maybe I can use it, and it sure won't hurt for other people to hear it as well.

Mr. **Myers**. Senator Gramm, I think we have an extremely focused and clean strategy for NASA. From a programmatic standpoint, the Shuttle was built for the purpose of taking man into space and back to Earth again, and to be able to take equipment to space and bring that equipment back to Earth; to repair devices in space, and to place things in space after checkout.

The shuttle was also designed to satisfy the requirements that would come with a space station because eventually the strategy of NASA was to lead to long duration man in space so that eventually man could explore the universe. The pattern has continued to fall into place.

Senator **Gramm**. Could I just stop you here? Would you think it's an overstatement to say that we might not have gone to the shuttle when we did, had not we had the objective of the space station in mind?

Mr. **Myers**. I think that's very possible. I was there at the time that programmatic aspect was being considered in our strategy. The strategy had called for a capability of transporting man to and from space, as well as payloads, so we could satisfy the up and down requirements of a space station. There wasn't any question about that being one of the key elements of the reason for the shuttle.

The shuttle is a part of the strategy that calls for the space transportation system, space station, long duration man in space, and eventually leading to the ability of humans to expand into the solar system. The problem with describing the overall manned space flight strategy is that along with it is a tremendously powerful interaction of man with science. Our science programs are mixed between unmanned automatic robotic devices that go out into the solar system and a series of experiments where man is very much involved in a research laboratory environment in space.

They are separate but intertwined, and they are clearly interactive in implementing the kind of strategy that we have at NASA.

Now, aeronautics stands alone. The aeronautics program is a tremendous driver to support U.S. industry in keeping our balance of trade ahead of the rest of the world in commercial transport exports, and in reaching forward in technology in a way that can help the industry when the time comes for them to apply that technology to commercial transports.

So astronautics stands a little aside but is interactive,--the aeronautics program also advances technologies that will apply to supersonic transports if supersonic transports end up as an environmentally acceptable device.

I think the fundamentals have always been there. Our strategy has always been the same. It has always led toward the things that inspire young people to go into technical education, the things that give people pride in the United States and in the technological capabilities of the United States, the things that spin off into thousands of devices we all accept every day such as medical devices and product improvements which NASA documents in what we call tech briefs. The fundamentals include the space shuttle, space station, exploration.

Senator MIKULSKI. Senator Grassley.

SPACE OPERATIONS

Senator GRASSLEY. Thank you, Madam Chair.

I wasn't here for your opening statements. I appreciate very much your coming here and particularly devoting a great deal of time. It is my understanding you'll be here today and tomorrow, so I'll be back tomorrow to ask you some questions as well.

I want to start with what might seem like a very basic foundation question, but I think it's very important that I have a better understanding of what you mean by space operations. It seems to me like you use it to describe a wide variety of space-related activities, so broadly used that it seems to encompass almost any space-related activity.

So could you give me a short definition of the term and give me some examples of NASA space operations activities or projects?

Mr. MYERS. Space operations generally deals with things that we do over a long period of time in space ranging from operating scientific probes to operating a shuttle in space. Those are two extremes. They involve monitoring how the device is working, commanding it to do certain things. They also involve the personnel who are committed to the long-term operation of a device in space.

I think we could discuss more specifically a special area; for example, we could talk about the operation of the shuttle as one element. Or we could talk about the operation of something like the Hubble Space Telescope as another area. Long-duration operations involve updating equipment, gathering data, monitoring the health of the systems, and things of that nature.

OPERATING PERSONNEL

Senator **Grassley**. It would seem to me that most of the current NASA operating personnel would be working in areas such as ground operations, and I understand that to be preparing payloads for space shuttle as an example, or flight operations like launch preparations and processing.

Could you tell me how many operations personnel are employed by NASA at the Johnson and Kennedy Space Centers and how many operations personnel are employed by NASA contractors?

Mr. **Myers**. Could we do that for the record? We have that data but we have to collect that.

Senator **Grassley**. All right.

[The information follows:]

Operating Personnel

In fiscal year, the current NASA estimate for civil service and contracted personnel involved in operations at Johnson Space Center and Kennedy Space Center are:

JOHNSON AND KENNEDY SPACE CENTERS PERSONNEL

	Civil servic	Contractor
Johnson Space Center	1,107	5,840
Kennedy Space Center	1,280	8,008

SPACE OPERATIONS ENGINEERING

Senator **Grassley**. It is my understanding that there is a NASA aerospace training specialty for operating engineers. What kind of educational background does NASA require for operations personnel?

Mr. **Myers**. We generally want the cream of the crop. We are looking for technical people to do that kind of work, and we continue to battle with the industry and with the other people that are looking for technically trained people to move them into these areas. As you know, we've had great difficulty with our salary increases being suggested, then cut off. We've had difficulty attracting some people into NASA, particularly those with more experience. We're still able to get young people and train them in our system; we are putting more emphasis on the training of young graduates that can be brought into NASA and then gradually moved into these positions of responsibility.

Senator **Grassley**. Speaking of young people, are there college programs which educate people in space operations engineering?

Mr. **Myers**. Yes; Admiral Truly, would you like to cover that?

Admiral **Truly**. Yes; there are. In my previous job prior to coming to NASA, I was Commander, Naval Space Command. For example, there are graduate courses at the Navy Postgraduate School and other graduate schools and also a number of courses in undergraduate colleges that deal specifically with space operations. They develop young people. Of course, in that case it was young Navy people to go out into what are called operations jobs, on the console operating spacecraft or operating payloads, as opposed to development engineers that essentially do development of a piece of hardware.

TRAINING FOR OPERATIONS PERSONNEL

Senator GRASSLEY. I think you started to refer to this, but I'm interested in how does NASA currently train mechanical engineers or computer engineers to undertake space operations responsibilities? Does NASA provide special training for new operating personnel?

Mr. MYERS. Yes; we do, but we also bring those people into kind of a tutorial program with the oldtimers. I was particularly impressed with a young man down at Johnson Space Center last time I was down there, who was in the process of developing a software program for bringing the oldtimers' knowledge into a knowledge-based system so that the young mission control operators could draw upon that background and knowledge that had been developed over 20 years in the oldtimers who are getting ready to retire. These bright young guys are so competent in the software business that they are pulling information out of the oldtimers and putting it into a software program that can be drawn up on the screen in mission control if there is an emergency that they need help on.

So while we do start in class training, we really do an awful lot of that training on site, under the supervision of our top people.

CONTRACTOR TRAINING PROGRAM

Senator GRASSLEY. For this part of your operation that's contracted out—and those were the figures you were going to give to me, as divided between your own employees and employees of companies—do NASA contractors operate their own training programs for operations personnel, or is there a joint NASA contractor training program?

Admiral TRULY. I think it depends on the contractor. We do require our contractors to have rigid training programs, but there are cases where we have operations jobs where both NASA and the contractors together are in a training program. A good example is in the mission control center down in Houston. If you walk through the mission control center in the middle of a shuttle mission, through the front room and then back through the back rooms, and shake hands with all the men and women who are on the consoles, you will be shaking hands with some NASA people, and also some contractor people but, without fail, each of them has come through a training hierarchy that has qualified them for the job at hand.

So I don't really think there's a simple answer to your question.

Senator GRASSLEY. I think you have answered it, though, to the extent that there are at least two and maybe three. One is some of them are entirely trained by the contractor. Some of them are jointly trained by NASA and by the contractor in a joint operation. Is there a possible third one where NASA entirely trains company employees for contracted functions?

Admiral TRULY. Generally in the programs that I am associated with, NASA oversees the training that the contractor provides for their people to meet our requirements.

Senator Grassley. Let me move on then.

PATHFINDER PROGRAM

One source of NASA research investment in operations technology is the Pathfinder Program. This program has been described by NASA to include support for operations technology that—and I quote—"will provide the critical technologies required for logistical support of human activities."

What kind of space operations research projects will Pathfinder support in fiscal year 1990?

Mr. Myers. I'd like to call the acting head of our Office of Aeronautics and Space Technology who is responsible for the Pathfinder Program. As he is coming up here, I'd like to say that Pathfinder is one of the things I spoke of earlier, Senator Grassley. It is a key new technology area that has languished at NASA for many years. We've been bringing it back in because it builds on fundamentals that will give us the information that would lead to the definition of a program to put an outpost on the Moon or a mission to Mars. Those technologies are the things that our Office of Aeronautics and Space Technology is now getting into. They involve the kind of technologies you have to have an understanding of before you can design and get cost estimate for, one of these exploration initiatives beyond Earth orbit.

Bob?

Dr. Rosen. Senator, we have broken the Pathfinder Program into four separate overall areas, and one of those areas is the operations area. What we're doing in the operations area is looking at the technologies associated with operating in space and on planets. There are several key areas within operations.

The first one of those is planetary rover, which would develop the technology to allow us to explore planets at large distances from where our spacecraft would land. Associated with that are the technologies for the front end of the rover, to make it smart to do science missions. That is called a sample acquisition analysis and preservation technology.

There are operations technologies associated with surface power, photonics, and an autonomous lander able to land in geologically interesting places. Basically what we are furnishing in the Pathfinder Program are the technologies to enable those exploration missions. We are not focused on training the individuals to carry out the operations.

Senator Grassley. My time is up. Tomorrow, if you will remember this line of questioning, I'm going to continue it here tomorrow. I can't come back anymore today, Madam Chairman. Is that OK?

Senator Mikulski. Absolutely.

Senator Grassley. They are going to be here tomorrow? The same group of people, right?

Senator Mikulski. I believe all will be here except you, Dr. Fisk.

Dr. Fisk. No; I will be here tomorrow.

Mr. Myers. It will be Admiral Truly that will be down for the launch.

Dr. Fisk. I go the next day.

Senator Mikulski. Are you going to be here?

Dr. **Fisk**. Yes.

Senator **Mikulski**. So you'll be here, but Truly won't; is that right?

Dr. **Fisk**. Admiral Truly will not be here tomorrow.

Senator **Mikulski**. OK. And, of course, Senator, your right to questions will be protected for tomorrow and then, also, any questions for the record.

We have two votes that are now scheduled on the Martin Luther King Commission, and then I am scheduled to be at a memorial service. We are going to recess the committee until the votes are over, if everyone could stay. Senator Garn will assume the chair to pursue several of the questions he has until we stand in recess tomorrow.

So, Senator Grassley, if you can come back, you can have some of your questions. If not, they will certainly be here for tomorrow. And then Senator Garn will come back.

Admiral Truly, good sailing, shall we say.

This committee will stand in recess subject to the recall of our ranking minority member, Senator Garn.

Senator **Garn**. I will vote at the beginning of the second vote and play O.J. Simpson to get back.

[A brief recess was taken.]

SHUTTLE C

Senator **Garn** [presiding]. The subcommittee will come to order. I appreciate your patience, gentlemen. While we had the votes, this is unusual. We haven't been having before-noon votes this year. I don't know what that's a signal of.

Mr. Myers, although there are no funds requested in your fiscal 1990 budget for development of Shuttle C, previous appropriations have been applied to preliminary developmental and design work. I understand that this work is yielding valuable technical information and more clearly defining the program costs, performance, and reducing the technical risk.

Would a 1990 or 1991 new start allow Shuttle C to significantly contribute to the assembly of the space station?

Admiral **Truly**. Yes, Senator. We have been working very hard on Shuttle C over a period of time. There are no funds in 1990 for the Shuttle C. We are completing, through previous years' appropriations, the studies and technical definition of that program.

Shuttle C makes a lot of sense to me because it is so completely in the position of using hardware that we've already developed—the main engine for the shuttle, the solid rocket motors, the tank, all those elements are there. You remove the orbiter and replace it with a shroud for payloads so that you have a capability for 120,000 to 150,000 pounds in orbit. That is a heavy payload and represents a capability which this country really needs, I believe.

The space shuttle is the baseline for the assembly of the space station. The Shuttle C clearly can carry heavier loads, and at this stage appears to have some very significant advantages for assembly of the space station. One of the obvious advantages is that you can more completely outfit the space station modules and check them out on the ground before launch. With the Shuttle C you can fill the station module up and check it out. With the shuttle, you have to leave the equipment out of the module before it is launched.

It looks like there are least two fewer shuttle flights involved if you use the Shuttle C for assembly. We've got some more work to do on that because it is a trade between assembly with man and assembly involving automatic rendezvous and docking, and we have not done all the system studies involved in that specific area. But it is clear that the Shuttle C's extra capacity would be useful in space station assembly, and if it were started in fiscal 1991, we believe that it would be available for relatively early assembly of Space Station elements.

ASSEMBLY OF SPACE STATION

Senator **Garn**. I believe an Office of Technical Assessment Report in 1988 suggested that it would reduce the time to assemble from 36 to 19 months. Do you agree with that?

Admiral **Truly**. I remember that report. I doubt if it would be that tremendous a reduction. I think that by the time we go through the process of assembly and ground checkout of the equipment prior to launch, we would probably not get that much compression.

COST DEVELOPMENT OF SHUTTLE C

Senator **Garn**. In terms of cost of development of Shuttle C versus saving a couple of Shuttle missions, what are you talking about, net difference in cost? Just a rough estimate.

Mr. **Campbell**. We are really working on the development estimate of the Shuttle C, Senator Garn, and we will complete that this summer. The estimates now appear to be in the range of about $1.5 billion to $2 billion, including development and the test flight.

The Shuttle C operating cost, of course, depends a lot on the flight rate at the time and what elements you include in the costs. The costs can range from about $190 million for a shuttle launch, based on the operations cost, to up to $300 million for launch if you include all the full-cost elements, the civil service support and amortization of the orbiter.

Senator **Garn**. I have always thought it was a mistake that we didn't have the funds to develop Shuttle C, but I would assume the benefits go far beyond. It's talked in terms of space station and faster assembly, all of that. But just the heavy lift capability, I would assume that you would agree there are far more uses for Shuttle C than just the space station.

Mr. **Myers**. Yes, I would certainly agree. It's hard to get people to come out specifically on this. We have looked at planetary payloads, large landers where we have had sample returns. We think there would be other uses in the military, but those haven't really come into focus yet.

ADVANTAGES OF SHUTTLE C

Senator **Garn**. Well, I guess we could look at in terms of outsized cargo, as we used to look at in the Military Airlift Command. Some airplanes were designed for outsized cargo, and as we develop in space there will certainly be need for heavier and larger payloads than we're talking about or even envisioning now.

Mr. **Myers**. If I may, Senator, one of the really great advantages to me of the Shuttle C is that you don't have to have a high flight rate to invest in the system. It is designed to operate off of the shuttle pads and therefore uses all the same elements of hardware. You get the same learning curves that you do out of the shuttle production. You don't have a unique new infrastructure of manufacturing to be able to do it. The same people have the background to check it out and so it really merges directly with the shuttle program and would have some real advantages from an operations cost sstandpoint.

NATIONAL AERO-SPACE PROGRAM

Senator **Garn**. DOD announced last week its intention to terminate their participation in the NASP program and proposed to transfer funding and management responsibilities to NASA. They've also proposed for legislation permitting NASA to obligate $100 million in DOD funds for the program in 1990 only. Based on these developments, how do you propose to proceed with the program?

Mr. **Myers**. We have suggested that we could take over the program from the standpoint of management of the program as a technology program only. We could propose that we trim the program back to a moderate technology program. We have not examined it sufficiently to really make the estimates of that cost, but certainly it would be well below the dollar levels that have previously been planned for the program. We could carry out that technology program over a period of 3 or 4 years. At the end of that time we would be prepared to do a design and definition study that could define an X-30 type of aircraft that, if the administration decided to proceed, would be funded by the military.

We are in the process of reviewing where we stand now in the program with the DOD. We've had a joint project office in this program and we are in the process of defining what costs would be involved if the program were terminated, where the program is at the moment, and what technologies appear to be important; in that process we will be reviewing this with the space council for policies of where the Nation should go in the NASP program.

Senator **Garn**. Considering the difficulties of budget pressure we've talked about on the rest of NASA, do you feel this technology is worth pursuing even if DOD doesn't participate in the development of the X-30 vehicle?

Mr. **Myers**. That is, I think, a judgment that is going to have to be looked at, Senator. No. 1, I wouldn't expect our budget to increase to take care of the technology. In fact, with the proposed $100 million transfer to NASA from DOD, it is possible in my mind that it might even be reduced. If there is not a military requirement in the foreseeable future, as Mr. Cheney has stated, the question will be whether there is a civil requirement in the foreseeable future.

That's a very big question, and I think it is unlikely that in the foreseeable future you can see the civil use of the NASP technology. The idea of high-speed transports not supported by the military probably really does not fit into the pattern of how people have previously looked at the NASP development.

Those are the issues that we are going to have to deal with from a policy standpoint in the administration through the space council.

CREW EMERGENCY RETURN VEHICLE

Senator GARN. The Aerospace Safety Advisory Panel strongly endorsed the need to develop a crew emergency return vehicle for the space station. What's the current status of that project?

Mr. MYERS. We've done a lot of studies in house on the assured return of the astronauts from the space station. We've reached the point where we feel it's necessary to go out to the industry and have a study done by industry now. We are in the process of developing an RFP where we would go to the contractors and ask for studies that we would define as phase A prime in NASA lingo. It is a program definition study up to the point of getting a rough cut at the costs, and we will, at the same time, study the specific requirements for return.

We have had difficulty in trying to get a clean specification of what the specific conditions are which would cause you to bring back one or two crew members or a full crew from the space station. We are going to have that studied also during this phase A prime study. We will then write a needs statement for the crew emergency return vehicle and will be then ready to go forward with a phase B program for full definition and entry into development.

Senator GARN. Do you feel that the escape mechanism on the shuttle is worth the expense and time we put into that, over the last couple of years?

Mr. MYERS. Yes, I do. I think Admiral Truly may want to add to that.

Admiral TRULY. The escape hatch and what we call a firemen's pole has a very limited capability for escape, but if the shuttle should find itself in stable gliding flight, it is a way out of the vehicle which was not provided before. It was a judgment call on the part of the management council, which consisted of the four center directors and myself to recommend to the Administrator that we incorporate the safety escape hatch mechanism.

It was our unanimous judgment that it was worth the expense we went to and it is now a part of our capability in the shuttle for all shuttle flights. I would emphasize that it was a judgment call because there were no probability statistics. It was not an arithmetic exercise. We either provided the crew, after the *Challenger* accident, with a way out in that situation or we didn't, and we chose to do it.

Senator GARN. I understand, and I don't want to be misunderstood, but I guess looking from the outside in, but from my own experience, that it has such a short period of time, that I don't know that it would make me feel any better about flying again, having it there; no applicability in the launch phase.

The only reason I bring that back up is what we can do from the space station. I guess I also have a hard time keeping things in perspective. We kill 20,000 a year on the highways of this country due to drunk drivers and sort of say, "Ho, hum. No big deal." The Surgeon General tells us that 390,000 people die in this country every year because of cigarette smoking, and we still subsidize tobacco farmers as an official policy of this Government. Yet we're going to devise some escape mechanisms for volunteers who want to fly in space, that have limited applicability.

I wouldn't be so concerned, I suppose, if we didn't have such limited budgets. But those are policy decisions that obviously have to be made and they're driven by some other forces like Rogers Commission Reports and so on. So I won't push you any further. I just think maybe there are better ways to spend some money, particularly when there has never been a draftee in space. We all knew what we were doing, I think. Some of us spent a considerable number of years of our life begging to get on.

Mr. MYERS. Mr. Chairman, I think you noted that I said we were going to make a study of this and bring it to a point of definition sometime next year. We have really had a lot of painful discussion inside NASA as to whether it is necessary, and this study and the definition of the requirements for bringing them back are still open issues to me and need the full judgment of NASA when those studies are completed to make the decision. We do have this raceway in the space station. We do have safe haven where we can isolate systems from other systems. We do have a more rapid response on the shuttle over a period of time.

So all those things are still open and I believe subject to further study.

Senator GARN. Well, I probably should just leave it alone, but I very distinctly remember I wanted to have one complete orbit of the Earth, all the way around, without being interrupted. And we were inverted at the time. Dick, as you know, that's the best view and you can float there on the flight deck and look out the overhead windows. I had my Walkman on, and I listened to the Swan Lake ballet all the way around the Earth. I felt guilty because I had the distinct thought that if something happened, it just didn't make any difference. The reason I felt guilty was for my wife and seven children, a few grandchildren, and so on. But personally I thought, well, if something happens right now, so what? I've seen it all and I've done it all and it really doesn't make any difference whatsoever. If they told me that you had 5 days left and the oxygen was over, it would sure be a beautiful 5 days. No duties, no checklists any more.

Weird thought maybe, but I'm digressing from the point. But I'll look forward to the study of whether it's something that is economically justifiable in terms of the additional safety we might achieve from it compared to other programs.

LONG DURATION EXPOSURE FACILITY

I understand that current assessments of the long duration exposure facility [LDEF], which we've all seen down at the Air and Space Museum, indicate there is significant risk that it will begin to tumble and reenter before it can be retrieved later this year. Is that correct?

Mr. MYERS. There is a massive solar activity and it is causing the upper atmosphere to move up, a few molecules to move up. It is dragging down the LDEF earlier than we had previously predicted. We are in the process of studying the potentials that would be available to us to be able to still retrieve this before it does get to that low altitude where it starts to tumble.

Dick may have some additional comments to make on that.

Admiral TRULY. When we initially scheduled the LDEF retrieval mission for late this fall, we anticipated that there would be several months of margin from the solar cycle caused reduction in altitude at the time we made that initial scheduling. The solar cycle has built up and is predicted to build up higher. We are very definitely in a risk situation, not a safety risk that anybody's going to get hurt, but a risk situation where the earliest possible time of the planned shuttle flight is going to be inconsistent with how quickly the LDEF descends into the atmosphere.

We are looking hard at the manifest and are going to fly that flight as early in the series of flights as we can. But nobody knows when the sun turns around tomorrow if there's going to be a sun spot appear on the limb. If the sun spots continue to increase, that risk is going to go up.

As of today, we certainly haven't lost the LDEF, nor do we have assurance that we can get it. As the LDEF slowly decays into the atmosphere, eventually it will get to the point where it will begin to build up rates. After rendezvousing and joining up with it, the rates will become too high to grab it with the remote manipulator system [RMS], the arm.

We're going to have a shot at it. We desperately hope we get it. It has been on orbit for several years.

Senator GARN. As a matter of fact, it has been up much longer than you originally anticipated.

Admiral TRULY. That's right. It will be of great value to us if we can retrieve it and we intend to do so if the solar cycle lets us.

Senator GARN. So right now, it's just hope you can proceed with the manifest and get it before it decays too much.

Admiral TRULY. That's right. We're doing everything in our power to fly the flight and prepare the crew for the mission. We'll just have to wait until later this fall and see how it comes out.

Mr. MYERS. Of course, we're tracking it to see what sort of predictions it has for reentry.

SAFETY OFFICE

Senator GARN. Do you feel that the Safety Office is now being adequately funded?

Mr. MYERS. Yes, I do. We've looked at that each year and I think that George Rodney has done an outstanding job of leadership in that area. We do have his central activity properly funded, and we do have within the centers significant increases in safety and reliability and quality assurance activity that I believe adequately cover our present position relative to safety on the programs.

Senator **Garn**. Do you feel that some of the initial problems associated with organizing it have been resolved?

Mr. **Myers**. I do. We have an outstanding man in charge. I think George Rodney has done a superb job of being able to report to the Administrator but still have the confidence of the groups he works with. That's a tough job and he's done it very well.

POST-EMPLOYMENT RULES

Senator **Garn**. At the beginning of the hearing, we talked about Dr. Hinners and others leaving early, and we've all been aware, I think, of why. Do you anticipate many more between now and the May 16, as a result of our overreaction to—and I'll say it very bluntly—we've gone from the extreme of Watergate to the other extreme where we're going to make everybody so pure by law that nobody will be able to serve in the Government if we continue.

Particularly in the technical fields, it seems to me that people who have devoted their life to this Government and NASA are very highly skilled scientists and engineers who could have all along made a great deal more money without any question because of their technical background and expertise, and we're going to say when you leave, you're going to be a neuter. You've got to keep your mouth shut and your ears shut and your eyes closed. You can't talk to anybody, can't even have any lunch. It seems to me we're going to pay for it.

So do you know of any more that we might be losing very quickly?

Mr. **Myers**. We are paying a price for it. We've lost four senior people down at Marshall Space Flight Center. We're losing Noel Hinners and Jim Odom. I will say this: NASA has a lot of resilience. We've talked extensively with J.R. Thompson about the problem at Marshall. He thinks he has the depth of people at Marshall to be able to fill in behind.

I am very concerned about it from the standpoint of the future. We still want to be able to bring people in industry into NASA. If I were in this position 3 years ago and the President called me to come back here, I probably would not with this set of post-employment rules. They are unclear. They are vague enough that they can be interpreted different ways by different people, and unfortunately we're in the position where one wave happens after another, and we are not yet completed with the kind of terrible action that cuts off the opportunities for people to either leave for industry or to come from industry to Government and go back again.

I don't know how it can be seen as an advantage to this country to penalize the people who have good ethics and good honest relationships with their activities when they penalize the few that have been miscreants in this operation.

Senator **Garn**. I agree. I think there's a different category here, too, because most of the abuses that you have seen in my opinion have been not technical types, have been political types. They come into Government service deliberately, with the intent of getting some credentials, staying 2 or 3 or 4 years or something like that, and then marketing themselves to the private sector.

I think that's quite different—and that's primarily what the law is aimed at—quite different than people who have PhDs and engineering degrees and technical backgrounds, who if that's what they wanted, wouldn't have stayed 15, 20, 25, or 30 years. They could have left any time, not on the basis of who they met in Washington, because a lot of them have never been to Washington; not on the basis of any political influence or anything; on the basis of their educational skills and their background. That's what they've got to market, not influence.

So it isn't just NASA. It seems to me, once again when we're losing the war of trained scientists and engineers to West Germany and Japan and the Soviet Union, and we can't train enough math and science teachers in this country, we're simply going to say OK, the best people will never enter Government service. They will stay in the private sector to begin with, and we won't have the benefit of their expertise.

I don't know the answer either, but I think it's unfortunate that the do gooders can't take a more balanced view of what is going on. Maybe if we could examine some of the press in the same detail that they examine some people in Government, we might get a little more balance in the accusations.

SENIOR EXECUTIVE PAY HIKE

Mr. **Myers**. Senator Garn, there's another point that was involved in the leaving of a few of our top people. That was the expectation of the salary raise in the senior ranks and then having those hopes dashed. I'm sure that helped influence some of these people who were on the borderline about whether they would stay for their full career at NASA or leave to go out to greener pastures.

It was really an emotional hit inside NASA to have that hope for increase in salary and then have it dashed.

Senator **Garn**. Well, I'm one who has always been willing to decouple salaries. When I was mayor of Salt Lake City when I was young, a long, long time ago, if I wanted to keep a chief of police, a fire chief, a city engineer, a water superintendent, and all of that, it was absolutely necessary to decouple it from the mayor's pay. When I left as mayor, they all made a lot more than I did. That was the only way to get their salaries raised. Mine was politically impossible.

That's what Congress ought to do. We ought to decouple our raises from that of the rest of civil service so that we don't penalize them because of our own political problems. I would guess that that's probably still true today in Salt Lake City, that the professionals probably make more than the politicians, at least I hope that's still the case

FLIGHT TELEROBOTIC SERVICER

Now that the administration has decided not to commercialize the flight telerobotic servicer, how do you propose for the program to be funded and how much additional funding will be needed in 1990?

Mr. CAMPBELL. The adjustment in fiscal year 1990 was $30 million and that's our current estimate, although there may be some increase over that in 1990. That's what we are examining at the time.

Mr. MYERS. We've agreed to absorb that $30 million within the space station program costs.

ORBITAL DEBRIS RADAR

Senator GARN. Your request for orbital debris radar development is a new proposal for 1990, based on studies showing debris to be a significant problem for Space Station Freedom. Will you have this radar in place in time to prevent a slip in the final design of the pressurized modules?

Mr. MYERS. Yes; we will.

Senator GARN. Do you have an estimated cost for the system?

Mr. CAMPBELL. The total is $20 million. An additional $4 million has already been funded a study effort.

SUPERSONIC COMMERCIAL TRANSPORT VEHICLE

Senator GARN. You proposed a new initiative to begin the development of a supersonic commercial transport vehicle for the United States. What other nations are currently engaged in that type of research?

Mr. MYERS. We know that Europe is doing quite a lot of work in this area. We've seen some indications of probably a more aggressive program than we have. We're not actually looking at designing a supersonic transport. The work that we're looking for here is work that would lead to understanding the environmental impediments to a supersonic transport.

We're going to look, for example, at what sweep does to sonic booms, what altitude does to sonic booms, what configurational changes you could make that would reduce the sonic boom effect. We're going to look at fuels and what they do to ozone generation or depletion. We're going to look at the issues associated with how a supersonic transport fits into the commercial transport area.

Along with that, we will do some work in wing sweep, effects that perhaps could be looked at as configurational, but we will be working very closely with the industry and they will be doing the configuration work on their own.

Senator GARN. Are the Europeans ahead of us in that area?

Mr. MYERS. I think right now the Europeans are ahead of us. With the Concorde, the understanding brought to them from the operational standpoints of the Concorde and their interest in this area, there seems to be more activity in terms of research and involvement of the industry in Europe than we have in this country right now.

Senator GARN. In light of the Concorde's experience, do you have any idea what the potential market might be, something that would become commercially feasible without Government subsidy? I mean I've enjoyed riding the Concorde, but obviously it's been subsidized very heavily all these years to keep it going.

Mr. MYERS. There are those, both within industry and within NASA, who believe that a viable supersonic transport, much more efficient than the Concorde, could make it on a trans-Asian route. There is a tremendous projection of increased market in that area, and I think some estimates are that 300 airplanes could be used just in the trans-Pacific route.

JAPAN'S RESEARCH AND DEVELOPMENT PROGRAMS

Senator GARN. Speaking of Asia, what is Japan doing in their R&D?

Mr. MYERS. Japan is doing studies in this area. But I have not personally seen as much in that area. Perhaps, Bob, you would like to make a comment on that?

Dr. ROSEN. Senator Garn, the Japanese are looking at the key element of a supersonic aircraft, and that's the engine development. They have work underway on a turbo-engine, which is their view of what the key element would be to development. Our understanding is they would view that as a way that they could get into the competition.

The difficulty with the issue is that a supersonic transport would probably provide real competition for the large Boeing 747 kind of aircraft. It would allow some country like the Japanese to enter the market with a new aircraft, a new product, and cause significant damage to our aircraft industry in this country.

FUNDING FOR NASA PROGRAMS

Senator GARN. Let me just go back to where we started, about the funding for this year and what a difficult problem it's going to be. One of the problems is that some people don't believe that. They think that you and I and others are simply calling wolf once again because we've been doing it for 2 or 3 years. Those are the ones who don't serve on the Appropriations Committee and have seen the machinations and the smoke and mirrors and pulling rabbits out of hats for the last 3 years, and achieving that.

When I think of starting each year and looking very bleak, and I certainly am going to miss Congressman Boland on the House side because he and I had an extremely good relationship for a long number of years. So each year, yes, we were able to save enough money to keep the space station going, but it wasn't easy. It wasn't easy at all.

Last year it required the fencing. It finally ended up having to work it through the House side because the House side was more favorable, and ended up with a 7-to-6 vote on the Senate side to keep the funding going. It was that close on the conference committee and very nearly failed.

So I'm getting the same argument again, "Oh, come on, Jake, it isn't that serious." In fact, last year it got a little bit embarrassing because every time I would call a fellow Senator late in the year after this was all over, they'd say, "Jake, I've already committed to you. I'm for you." I said, "I wasn't calling you about NASA or the space station. I was calling you about some entirely different problem." And so I guess I had gotten the reputation that I never called except about this particular issue.

But that is a problem. The fact that we have been successful, regardless of difficult, that I'm hearing all the time, "Oh, you'll do something; you'll pull something out of the hat." I don't see any rabbits in the hat this year.

Certainly after the budget allocations that were passed and the enormous pressure on the budget this year to meet the Gramm-Rudman-Hollings targets, particularly in light of when—and I think the press accounts are absolutely correct—that the President and the Congress, everybody can be criticized for being overly optimistic in how they think the economy is going to perform. Therefore, I think the budget deficit is greater than any of the projections, even in the so-called compromise between the President and the Congress.

So I just want to alert you to that fact, that because we have said it was difficult the last 3 or 4 years, and it certainly has been, that now that's being turned around the other way and they say, well, you've said that the last 2 or 3 years.

So we've got to back up with facts and figures and it's going to take a lot of that kind of effort, not just talking in generalities about how great space is and all the benefits and the speeches we all give, but we're going to have to be very, very specific and outline what various budget cuts will do to specific programs and how it's going to impact.

So as we get into this budget cycle, you may have to dig into that budget very, very carefully and give us a great deal more detail than we have ever asked for before in order to justify an adequate budget to keep things going.

Any closing comments for today that any of you would like to make? We will be back tomorrow.

Mr. MYERS. I think you are right on target. The problem is that the space station is really a keystone. It's the archstone in the whole future of our space program in the United States, and if the budget is cut dramatically, the space station is probably the thing that would be canceled.

Senator GARN. The thing that amazes me is some of the critics who talk about cutting are some of the very same people in the Congress who say that the space program has no direction. It's kind of ironic that if you take out the direction, well, maybe that's their self-fulfilling prophecy. If they succeed, then they can make their charges correct that there is no cornerstone, there is no goal, NASA isn't going anyplace. Maybe that's it. Maybe I shouldn't be so cynical, but I've been around here 15 years.

Mr. MYERS. If that were to occur, the United States would have to clearly mark on the wall that we're going to be second class in leadership in space.

SUBCOMMITTEE RECESS

Senator GARN. Thank you very much, gentlemen. We'll see you tomorrow. The subcommittee is recessed.

[Whereupon, at 12:40 p.m., Tuesday, May 2, the subcommittee was recessed to reconvene on Wednesday, May 3.]

VA, HUD, AND INDEPENDENT AGENCIES APPROPRIATIONS FOR FISCAL YEAR 1990

WEDNESDAY, MAY 3, 1989

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 10:10 a.m., in room SD–138, Dirksen Senate Office Building, Hon. Barbara Mikulski (chairman) presiding.

Present: Senators Mikulski, Fowler, and Garn.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

STATEMENT OF DALE D. MYERS

ACCOMPANIED BY:

- **NOEL W. HINNERS, ASSOCIATE DEPUTY ADMINISTRATOR**
- **THOMAS CAMPBELL, COMPTROLLER**
- **GEORGE ABBEY, DEPUTY ASSOCIATE ADMINISTRATOR FOR SPACE FLIGHT**
- **LENNARD A. FISK, ASSOCIATE ADMINISTRATOR FOR SPACE SCIENCE AND APPLICATIONS**
- **THOMAS L. MOSER, ACTING ASSOCIATE ADMINISTRATOR FOR SPACE STATION**
- **ROBERT ROSEN, ACTING ASSOCIATE ADMINISTRATOR FOR AERONAUTICS AND SPACE TECHNOLOGY**
- **ROBERT O. ALLER, ASSOCIATE ADMINISTRATOR FOR SPACE OPERATIONS**
- **GEORGE A. RODNEY, ASSOCIATE ADMINISTRATOR FOR SAFETY, RELIABILITY, MAINTAINABILITY, AND QUALITY ASSURANCE**
- **C. HOWARD ROBINS, JR., ASSOCIATE ADMINISTRATOR FOR MANAGEMENT**
- **EDWARD A. FRANKLE, GENERAL COUNSEL**
- **L. HERBOLSHEIMER, DEPUTY ASSISTANT ADMINISTRATOR FOR COMMERCIAL PROGRAMS**
- **BENITA A. COOPER, ASSISTANT ADMINISTRATOR FOR HEADQUARTERS OPERATIONS**
- **FRANK MARTIN, ASSISTANT ADMINISTRATOR FOR EXPLORATION**
- **HARRIETT JENKINS, ASSISTANT ADMINISTRATOR FOR EQUAL OPPORTUNITY**
- **A. FOSTER FOURNIER, DIRECTOR, PROCUREMENT MANAGEMENT DIVISION**
- **ROBERT W. BROWN, DIRECTOR, EDUCATIONAL AFFAIRS DIVISION**

NASA/DOD RELATIONSHIP

Senator **Mikulski**. Good morning, everybody. The subcommittee will once again come to order and we will continue to take testimony from the NASA agency. Yesterday, we covered a good bit of ground.

Senator Garn, while I'm going through the questions I wanted to ask, do you have some that you would like to pick?

Senator **Garn**. I have a few short questions.

Senator **Mikulski**. Go ahead. You can have a couple long ones, too.

Senator **Garn**. First of all, I wanted Mr. Myers to talk a little bit about NASA/DOD cooperation and, more than a question, express some of my concerns and then get your reaction. It is often pointed out that 20 years ago, NASA's budget was double what DOD's space budget was, and we all know that that relationship has been reversed.

I am one that is not particularly critical of that, as some of my colleagues are, because DOD's space efforts are almost entirely defense. Even those who favor arms control ought to be very glad we're putting up the spy satellites so that we can verify arms control treaties and navigation, communications, and all of that.

That doesn't particularly disturb me. What does continue to disturb me is what appears to be lack of cooperation between the two agencies. We obviously made a decision due to budget constraints years ago to put all of our eggs in the shuttle basket because NASA didn't have the money to have a balanced fleet of ELV's and do the shuttle program as well. But now I see us going back the other direction with all sorts of different vehicles that the Air Force wants, billions in Titans, Deltas, and Atlases, and which obviously reduces use of the shuttle.

I am also disturbed that NASA sought a Titan IV and was turned down by DOD. So I think we've gone from some unrealistically forced cooperation in the past, with the agreement for DOD to use eight shuttles per year, to virtually no cooperation at all. I don't know how we can afford that in terms of the budget difficulties we have right now.

So I am concerned—and it's not a new concern—of how we can get better, more realistic cooperation between DOD and NASA rather than the continuing difficulties. As I say, I don't understand why NASA was turned down on the use of a Titan IV by the Air Force.

Do you have any comments on my feelings?

Mr. **Myers**. Senator, I was also somewhat taken aback when I first returned to NASA in 1986. I had worked very closely with the DOD when I was here from 1970 to 1974, and we had a very good relationship at that time. But DOD's position did finally become clear to me. The *Challenger* accident had occurred. They had had their difficulties with their Titan III 34D launches. They had had trouble with their strap-on boosters, too, and the whole country was down as far as payloads were concerned. Everybody had very high priority payloads and everybody was kind of sniping at each other.

Jim Fletcher and I went to work on that and I personally spent a lot of time with the Secretary of the Air Force and then with the Deputy Secretary of Defense, William Taft, and developed with him the idea of reinstating the Aeronautics and Astronautics Coordination Board that had been put in place the first time I was here.

We've had several meetings with that group and it has really cleared the air on the problems that we had with the DOD, and I think that the cooperation now is improving dramatically. Let me give you an example.

DOD'S COOPERATION WITH NASA

Senator **GARN**. Not that Titan IV is not an example; right?

Mr. **MYERS**. Titan IV is an example where we had never had that committed to us by the DOD. We had an agreement that if it were possible, we wanted to have the Titan IV as a backup to some of our launches, and we knew at the time that there would be some difficulty because the Titan IV was under development. A lot of very high-priority military payloads were in place waiting, and the Titan IV had some difficulties in development.

It was during that time period that we recognized, with the Air Force, that there would not be an availability of the Titan IV. I think there has been a good approach to the idea of the development of expendable launch vehicles along with the shuttle. We, too, are needing them and using them. I think it is helping to stimulate the commercial launch vehicle industry and I think that together with the Air Force, we've worked cooperatively in making available NASA and Air Force facilities for the commercial industry.

Senator **GARN**. You were going to give me an example of where you felt the cooperation had been improved.

Mr. **MYERS**. Yes; we worked very closely with the Air Force on manifesting the payloads for the shuttle and we had payloads manifested for Space Shuttle 102 for early July. Because of the priority we had put on the other vehicles, we had gotten ourselves into a position where we just couldn't man up sufficiently to get that Orbiter 102 modified in time for launch in early July.

When that vehicle slipped, it caused a backup of payloads to the point where, if we were to meet the DOD's requirement, we would not be able to assure ourselves of the launch of Galileo in its window. The DOD has been very cooperative. It moved its very high-priority payload beyond the Galileo to make room for us to hold that window. I think that's an indication of the kind of cooperation that we look forward to continuing with the Air Force.

Senator **GARN**. Don't you think that where there are common requirements and needs, however, that there could be a lot more jointly funded programs rather than the competition now that we have for dollars?

Mr. **MYERS**. Well, the fundamental issue is concurrent launch capability; that is, the ability to launch on both the shuttle and an expendable launch vehicle. The DOD has certainly embraced that very strongly in the development of its various expendable launch vehicles and I think that at this time in our manifesting, the balance is about right.

We have about two flights per year of military DOD missions, and with the tremendous backlog that we have, we think that's a pretty good balance. It does not give us the reimbursements that we would like to have, which would reduce our overall budget number but, on the other hand, there is certainly a need in this country to improve the robustness of our launch capability.

We endorse completely the idea of developing these additional expendable launch capabilities.

Senator **Garn**. I am really going beyond the issue of how many launches per year, to where you have common goals, common needs, that there can be more joint funding at the outset of these programs. The Air Force is very, very jealous. I say that as a retired Air Force officer. I am a supporter of DOD, but I am more of a supporter of a robust space program in this country. It may have improved, and I am glad to hear you say that, but I am not convinced that we still don't have two basically separate space programs competing against each other.

There are different needs. Obviously, there are some things the Air Force has to do on their own, and many things that NASA has to do. That's why I said where there are common requirements and common needs, that those be jointly funded.

Mr. **Myers**. One program in which we are jointly working together is the ALS Program. The Advanced Launch System is a program that has been jointly undertaken by the Air Force and NASA. We made an agreement with the Air Force about 3 years ago that the funding for the program would come from DOD.

Senator **Garn**. Yes, but they've downgraded that just to research.

Mr. **Myers**. But the program still supports the development of a new engine, at least the components of a new engine. I think that is a very significant and important joint requirement.

Senator **Garn**. But it has been downgraded just to technology development from where we started 3 or 4 years ago.

Mr. **Myers**. However, it does include the development of components that could be made into a new liquid rocket engine. I think that if we can hold it at the level of a technology program, we can put ourselves in the same position in which NASA was before the Apollo Program, where component technology led to the development of very large engines that could then be used for future programs.

What we're looking at here is an engine of the class of the SSME, but a much simpler engine which hopefully can be manufactured at very low cost. I think that's an important technology that we continue, and I think it's one where there is a clear case of a requirement that is a joint requirement between NASA and the DOD.

Senator **Garn**. Doesn't it, because of downgrading of ALS, doesn't it make it more important that we proceed with Shuttle C?

Mr. **Myers**. I think a simple answer to that is yes. There is a more complete answer that deals with what the logical next generation of launch vehicles for this country is. And there has been a tremendous amount of really good systems definition work going on between NASA and the DOD, leading to a better definition of what this next set of expendable launch vehicles ought to be.

There has been a general reduction in the sort of grandiose requirements which were described early in the ALS program, where there was the idea of a very large number of flights per year of a very large launch capability. That has been reduced pretty dramatically now, and we are back to where we're looking at a few launches per year of the very large size and quite a large number of launches in large size, that is the 50,000 to 60,000 pound class.

I think there is a converging of ideas between NASA and DOD on what would make up a logical next generation of launch vehicles which would include a—let me be very broad in the range—40,000 to 80,000 pound capacity expendable launch vehicle and a Shuttle C. That would really cover the range of things that we all visualize as the next generation of launch vehicle requirements.

Senator **Garn**. You can see where I'm driving. I can lead you down several bridle paths because I've sat here for 10 years and listened to the testimony year after year after year—we're going to go this direction, we're going to go that direction, and then because of budget constraints they get downgraded to technology development. We're not going to deploy this, we're not going to do that.

That is because of the limited budget dollars. I understand why. But that's why I make such a point of how I still don't think there is the type of cooperation between DOD and NASA that is necessary under these types of budget constraints. If we had lots of money, we wouldn't be having these discussions. Fine, let the Air Force do their thing; NASA will do their thing. But I see the programs come and go, up and down in emphasis, and it isn't because those are your choices; they are mandated by the lack of dollars.

Facing that reality, there has got to be some better way of working these two programs together where common needs are, and push forward—I guess I feel frustrated because of what we should have had flying by now, where we were a few years ago, what we've got today—and I think, well, if this continues down the road, we're going to be sitting here saying the same thing again, and we're not going to have the robust space program that we ought to have, because the reality is that we can't get the dollars that are necessary. No matter how much I want them, no matter how much you want them, there are competing needs that make that impossible, and therefore we've got to squeeze the most out of what we have, and that means DOD has got to be more cooperative.

I realize I have a bias, despite my military background, that I think most of the lack of cooperation comes from the DOD side. They want their own little space empire down there. I understand that. As an Air Force officer, you like to have your own fleet that you can control.

Well, I am taking far too much time. I'm sure I have more than adequately made my point. Thank you, Madam Chairman.

PREPARED STATEMENT OF SENATOR D'AMATO

Senator **Mikulski**. Thank you, Senator Garn.

Senator D'Amato has submitted a statement which will be inserted in the record at this point.

[The statement follows:]

STATEMENT OF SENATOR ALFONSE D'AMATO

Madam Chair, I commend you for holding this second day of hearings on the fiscal year 1990 budget for the National Aeronautics and Space Administration.

Yesterday, acting NASA Administrator Dale Meyers presented this subcommittee with a NASA budget request of $13.3 billion for fiscal year 1990. He indicated that this request is needed to keep NASA on a steady track forward—building on the successful missions and programs of 1988 and 1989.

However, as Mr. Meyers' testimony also stressed, the President's budget for NASA cannot be reduced significantly without the threat of derailing our Nation's aerospace program.

We were told yesterday that NASA's official budget request of $13.3 billion—while increasing NASA spending by $2.4 billion over 1989—represents a cut of more than $1 billion from its original estimate of its needs for 1990. As a result, key elements of NASA's core program—including the advanced communications technology satellite and the structural spare parts program for the shuttle—have been reduced or eliminated for fiscal year 1990.

I believe that further significant cuts would be short-sighted—and potentially crippling to our Nation's space effort. An additional cut of approximately $1 billion would, in Admiral Truly's assessment, result in the cancellation or total restructuring of the space station, or, potentially, the total restructuring of NASA.

We can scarcely afford to contemplae such actions—particularly when other nations are moving resolutely forward as full participants in the benefits of space.

The President has requested a budget for NASA that will allow our space program to move forward with vigor. I believe we must support this request.

The maintenance of a vital space program will provide our Nation with economic and technological benefits—and much more. As NASA Assistant Administrator Fish stated recently, it also holds the potential to "inspire in the people of our generation the hope for a limitless tomorrow."

Thank you, Madam Chair.

FUNDING PRIORITIES

Senator MIKULSKI. I think your points are well taken. As I understand it, the Air Force's space budget is something like $20 billion, almost twice what NASA's is. So I think that says something in and of itself.

I'd like to come back to the Agency's funding priorities. For this subcommittee to meet its responsibilities or its demands, whether it's the National Science Foundation, NASA, or veterans' health care, we estimate that we are going to need about $7 billion more in the budget authority. I am going to be asking you some questions about possible cuts, because we think we need $7 billion. At the same time, the House and Senate Budget Committees have approved versions of a budget resolution that cut NASA's budget function by about $1 billion. I know Senator Garn will be speaking to that on the Senate floor.

We are going to work really hard to get a 302(b) but we have to be ready, if we have to, to trim some areas. If we have to reduce the President's request for NASA, where would you recommend we would cut, say, at a $4 billion level— excuse me, $400 million level, not $4 billion—my gosh— $600 million or—I saw everybody kind of wiggle their bifocals on that.

Senator GARN. They wouldn't have the money for gas to come up to testify if we took $4 billion.

Senator MIKULSKI. That's right. We've got four, six, eight, but it could be $500 million, et cetera. Where do you think the first tier should be?

Mr. **Myers**. Well, we have agonized over this, Madam Chair. We went through that whole issue when we were going through the cuts that occurred as we went through the administration. We had over $1 billion cut out of the program there. We cut out programs. We stopped all new starts but two. We cut back one flight on the shuttle. We cut out a lot of our ambitious programs concerning the future that we had underway. We cut into our future technology, and we came to what we thought was an absolute minimum budget that still met the strategies that NASA had for the future.

That strategy is fundamentally one that says we still want to have the program that follows the same kind of thinking that NASA has had for almost 20 years, which is to develop a capability that can take man to and from space, along with payloads, and that's the shuttle; to develop a space station that becomes our step away from the Earth, where man can live and work with equipment and with research laboratory competence, and eventually put ourselves in the position that some future President can lead us out away from Earth toward the stars.

When you look at cutting that, it's like cutting an integrated package to pieces. It's like building an airplane without a wing, or building a house without a roof. It is a total integrated program. And because we have cut all the other programs so tightly, we tend to see the space station as the place that would take the beating in any of these major cuts of this nature.

I think if you look at the $600 to $800 million level, we would recommend very strongly to the President that we cancel the space station. I don't think that we could make the space station live if we were in that kind of a cut. Since the space station started in 1984, we've had three slips in the program. We did not slip the program last year, even though we had a $67 million cut in the program and a distorted distribution of funding. We didn't cut the program; we cut pieces out of the space station program.

Senator **Mikulski**. Mr. Myers, if you would withhold a second, because I was going to ask some questions about the space station. If we could come right to that, because what you have just said is a fairly dramatic statement, which is that we can't keep shaving at the space station. We either go ahead or terminate it.

I'd like to ask a few questions on that because just even listening to the rather grim look that you have as you go through this, you feel that when you went to OMB, that was a good list; that what has come back to us in the President's list is really a must-do bottom line budget.

Am I correct in that any other cuts would be damaging and that rather than play games and pretend that we're on certain course of the actions, we ought to bite the bullet and say what we're going to fund and then stick to it? Am I correct in that, Mr. Myers?

Mr. **Myers**. I think that is absolutely correct, Madam Chair.

SPACE STATION BUDGET REQUEST

Senator **Mikulski**. If I could, I would like to just then go through some questions to be sure we have it clear for the record.

You are requesting $2.1 billion, an increase of $1.2 billion for the space station. How far below $2.1 billion could you go for the station this year and keep the program on its track for the first element launch in the first quarter of 1995?

I just want to kind of tease this out, and if you think my questions are too rigid to get at what is the issue of the space station, please feel free to do it.

Mr. **Myers**. Let me give you the feeling we have on that. We're into a very tight budget right now. We have a tight schedule on the space station because we did cut elements out of the program that we're going to have to pick up later.

But on the other hand, we have fussed with that question and said, what kind of a cut could we take that would still leave us on schedule and leave the general content of the station the same? You never can say you can't take any cut. You have to accept the idea that some cut can be made. But the amount is very small. We think $100 million would be the kind of thing that would put us right on the verge of missing schedules for a couple of months or something. You know, it begins to expand the time.

Senator **Mikulski**. If the station were reduced by $300 or $400 million below the budget request, how would that affect the program's total development cost and schedule, and would a cut of that size still allow you to move forward with the station in fiscal 1990 to justify such an expenditure?

Mr. **Myers**. Madam Chair, we've been looking at that and have struggled with it. We have looked at various alternatives of trying to cut out pieces of the station that would still leave the station with its overall objectives, and we haven't finished that study yet. We are looking at $400 million right now.

We expect to have some feeling for that by early next week. Would that be too late for an input on this?

Senator **Mikulski**. Absolutely not. I mean this is probably one of the most significant decisions this subcommittee will make, not only for this subcommittee in terms of its work but in terms of our national future and our national honor, because we understand there are international commitments that are involved in the station.

So we want you to really crunch your numbers, give us the best advice, analysis, and commentary that you can. The record is going to be open, as are our minds to hear you. And I think you would concur on this, wouldn't you, Senator Garn?

Senator **Garn**. Yes; if I could just add one thing, Mr. Myers. Not just what it would cause in reducing portions of the station and the minimum level that would keep it going, but I'd like to know how much that would increase the overall cost, because the price of the station that people criticize is already much higher because we've done this before.

So if we say we can save $400 million, you can hang it together and keep it going, but I want to know for the record how much more that will increase the cost of the station because it is considerably more expensive because we've been doing this for 3 or 4 years.

Mr. **Myers**. We certainly are well aware of that. We've been working night and day on this thing and I think we will be finished by early next week. There is no question that we get are concerned about continuous slips in programs, because they drive up costs.

That is the difficulty; you cannot do a program, if it appears that there are going to be continuous major slips every year; the program won't last, and we will end up spending billions of dollars and then finally having a cancellation.

Senator **Mikulski**. That's what we need to know, then. What would be the significance? And then at what point would you then just recommend termination, beyond which then it would just be foolhardy and spendthrift to pursue it.

Mr. **Myers**. In that process, although we have not really judged how to do it, we would have to consider the possibility of restructuring all of NASA. If our overall budget will not be able to handle a totally integrated national space program, following the strategies that have been set up over years, then we probably need to ask what it is that we want to do as a Nation in this second-class level of space activity. That is an even more difficult issue for us to look at, but we must consider that in these larger cuts that you're talking about here.

Senator **Mikulski**. Sticking then in terms of the space station, I'd like to talk a second about overhead costs built into the station. You estimate that program management costs or overhead in the space station will remain fairly constant at about 35 percent, even though the overall cost increased.

Why don't overhead costs decrease in the space program as it would near assembly?

Mr. **Myers**. Let me speak to that 35 percent number first.

Senator **Mikulski**. Sure. And then also what it means in terms of overhead costs.

Mr. **Myers**. Overhead is that effort which is not at the prime contractors. We have four prime contractors: McDonnell Douglas, Boeing, Rocketdyne, and G.E. Those four contractors use up 65 percent of the money. The other 35 percent is what we call nonprime, and it is the contractors and civil service people involved in the program.

Because the space station program is in pieces at different prime contractors, we have elected to put some of our simulators and systems integrated testing at our centers. When we do that, we hire contractors to run those simulators, and those contractors, which are not prime, are part of that 35 percent. Now, that's direct work; that's not overhead.

When we look at those and remove that amount of the activity that's direct work on the contract, contractor activity outside of NASA, and look only at those things that are involved in program management which includes our civil servants, most of our software systems program, and the technical management information system, that ends up at about 20 percent.

So in the overall picture, those things associated with program management and the real sort of nonprogrammatic overhead is about 20 percent of the program.

Senator **Mikulski**. Will that go down?

Mr. **Myers**. It does decrease with time. It ends up as an average of 20 percent but it starts higher and goes below that as we go out in time.

Senator **Mikulski**. Now, you talked about the four prime contractors or the prime contractors in the four space station work packages. How much overhead, in dollar terms and as a percentage, is built into each of the contracts with the prime contractors?

Mr. MYERS. I'll have to get that for the record.

Mr. CAMPBELL. We can get that for the record. It varies with the contractors, but it averages in the order of 100 percent.

Senator MIKULSKI. One hundred percent overhead?

Mr. MYERS. That surprised me. We will provide that for the record.

Senator MIKULSKI. Yes; and you have to explain then what overhead means.

Mr. CAMPBELL. The structure of overhead in the plants averages that.

Senator MIKULSKI. Did you want to elaborate, Mr. Comptroller?

Mr. CAMPBELL. Well, the overhead in the plants varies with the contractors, but it largely involves the support to the direct labor people. In other words, facility maintenance and computer activity at the plant, and even some reliability functions are in the overhead areas.

And then there are the benefits. When you pay the direct salary, there are also substantial benefits at the contractors, and that's included in the overhead.

Senator MIKULSKI. You see, I think, Mr. Comptroller, there is a confusion about what the word overhead means, because what you're describing then is an actual service performed by people. If we then look and say that the overhead that's sometimes charged by a university when it gets a research contract, that overhead is taking care of gas and electric bill, mowing the lawn. It's not paying for the research that they're doing, say, on AIDS or cancer or rocket fuel or whatever.

So I think when we talk about overhead, overhead sounds like something that can be reduced. That's usually what is commonly talked about. Again, I don't want to use our whole committee time just doing this. We would like it for the record, and we would like clarification, so then we do know what we're talking about.

[The information follows:]

OVERHEAD COSTS

In the execution of Government contracts, contractors are required to have a certified accounting system which appropriately accounts for both direct and indirect costs. The indirect or overhead costs incurred are normal and necessary to do the work. These costs, as well as the other contract costs, are reviewed and verified by the Defense Contract and Audit Services (DCAS) agency.

While contractor overhead accounts differ, overhead generally consists of three basic categories of charges: Labor Overhead, Material procurement costs, and General and Administrative (G&A) Expenses.

Labor Overhead generally includes charges for managers and staff that are related to the pool of direct labor but are not easily allocable by specific task. Also included are fringe benefits such as vacation and sick leave, insurance coverage, and retirement. Labor overhead costs are specifically analyzed by DCAS to assure these costs are not excessive. In general, labor overheads are expressed as a percentage of direct labor costs. The weighted average for prime contractors' Labor Overhead is approximately 20 percent of total prime contractor cost.

Material procurement costs reflect the cost to the contractor of managing the acquisition of products and services from other firms. These management costs include engineering oversight, cost analysis, procurement management, and safety, reliability and quality assurance. These percentage factors are generally small, usually less than 5 percent of the material and subcontract costs, and less than 1 percent of the total prime contractor costs.

General and Administrative (G&A) Expenses typically include a prorated share of company-wide functions such as business development, marketing, accounting, contracts, corporate relations, and planning. G&A also includes prorated costs for facilities maintenance. The G&A weighted average for the prime contractors on Space Station is slightly over 7 percent of total prime contractor cost.

These percentages are consistent with those of other aerospace programs, and would be about the same percentages regardless of the number of contractors.

Senator Mikulski. Essentially what we are interested in is getting a dollar's worth of service for a dollar's worth of taxpayers' money in terms of the space station as we go through this most rigorous analysis that we've just discussed.

Mr. Campbell. Yes, Madam Chair. In many aerospace plants, there are dedicated laboratory activities that are generally for many projects, and those are carried in the overhead accounts.

Senator Mikulski. I'd like to just complete my part on the space station before I turn to Senator Fowler, though there are other questions I have on space science and strategic planning.

This relates to the life cycle cost management. As you know, GAO's report in March of last year talked about the need for life cycle cost management for the space station and GAO also said it would be in place by mid-1988. As we understand it, the space station project director didn't sign a directive implementing this management until March 28, 1989.

Where are we in terms of implementing life cycle cost analysis in the station program and why did it take so long?

Mr. Myers. Madam Chair, I insisted on a life cycle cost analysis on the space station about 2 years ago when I first started looking at the final definition of the space station.

They have been working on it since that time and have formalized it in this last year. It's a difficult area to deal with and one in which we look at the costs of development and the costs of operations and choose time periods to look at total costs associated with this.

It has been a hard issue to develop as a process inside NASA. It has now been applied to the space station and to the Hubble Space Telescope and we're working on other big programs now in that area. So it is becoming a built-in system within NASA.

Senator Mikulski. And you plan to use it in your design review in August 1990?

Mr. Myers. Yes; we will.

Senator Mikulski. Senator Fowler, we welcome you, if you wish to make an opening statement or go right into your questions. We are essentially following roughly a 10-minute rule for the first round and then back and forth.

Senator Fowler. Thank you, Madam Chair. As a long-time supporter of our space program, I am delighted to welcome representatives of NASA to this hearing and as a new member of this committee and this subcommittee, it's my first opportunity to review your programs, and I am delighted with that.

I'd like to focus in the limited time—I do have, Madam Chairman, some additional questions for the record.

Senator Mikulski. Without objection, they will be entered into the record.

CRAF-CASSINI

Senator **Fowler**. But I do want to use my time this morning to discuss with Administrator Myers one of my—I might as well go ahead and confess it—one of my personal priorities ever since I was the chair of the Space Science Task Force of the Congressional Space Caucus in the House of Representatives, and that is the CRAF-Cassini program.

For the record, Mr. Administrator or Dr. Fisk, whomever, could you lay out for the committee the rationale behind this proposed new start, what scientific benefits are anticipated, how you weight the cost-effectiveness of the joint program and other questions similar to the ones that the chairman was discussing with you on the space station program?

Mr. **Myers**. Senator, I am pleased to be able to discuss this particular program because it is one of the two new starts. We have crunched it down to where CRAF-Cassini is one new start. Some work on high-speed aerodynamics for transports is the other. And those are the only new starts in our budget.

CRAF-Cassini came in because it has been so long since we have started any new planetary activity, that we are in prospect of losing our position in the world in those major planetary activities that are very important to understanding our own planet.

I would like to have Len Fisk, who is the head of our Space Science and Applications Program, go further into that point.

Dr. **Fisk**. Senator, as you know, the Planetary Exploration Program of the United States has always been the most visible part of our space science activity. It's the one that appeals to the human instinct to explore, stimulates the young. You never see a picture of NASA without looking at pictures of Voyager's encounter with Jupiter or Saturn and volcanoes and so on.

CRAF-Cassini is in that same spirit; explores the outer solar system—Cassini to Saturn, and CRAF to a comet—and addresses a very fundamental question, which is to say what is the origin of life on the Earth? You might say it seems a little strange to go into the outer solar system to understand where life came from on the Earth, but in fact, of course, the Earth has changed so much over the 4½ billion years that we have lived here, that there are no clues remaining to what the origin was like.

And so you go into the outer solar system where the material is still preserved in its pristine state in both the large giant planets like Saturn and a comet that CRAF will visit. And you can find there the kind of organic material that was perhaps brought here by comets to the early Earth to give rise to life; you can also look at Titan, which is a satellite of Saturn, and see chemistry going on which may be, we believe, very similar to the chemistry that existed on the early Earth.

And so by looking at the material and chemistry of outer planets and comets, we really hope to be able to get clues as to how life started here on the Earth.

You pointed out that we put this together as a joint program. We did strategic planning in space science last year and we've laid out a plan that we hope to follow over the next 5 years. In the course of doing that plan, we realized that first of all, to answer the basic question about the origin of life, we needed to visit both Saturn and a comet, and that we could save a considerable amount of money doing it that way; the two missions separately are more than $500 million more than the two missions combined.

The opportunity exists with a common spacecraft design, to save a considerable amount of money, accomplish the science, and do the missions together.

Senator **Fowler**. What would be the consequences of another delay in initiating a new start in terms of schedule impact, in scientific terms, as well as the financial cost?

Dr. **Fisk**. This is a perishable opportunity due to celestial mechanics. You want to be able to get to the comet and to get to Saturn with a reasonable trip time. It is not reasonable to have a mission which is more than 10 years in duration and be able to be sure that you can in fact get the science at the end of it.

In order to get to a comet, you have to go first to Venus and then rendezvous with a comet. In order to do that, there's only a certain limited number of opportunities. There's an opportunity in 1995. There's an opportunity in 1996. By the time you get to 1997, there's a more than 10-year trip time, and therefore it is not possible to get to a comet. So we will either start CRAF this year or we will not do the mission.

In the case of Cassini, there is an opportunity in 1996 and in 1997, and by the time you get to 1998, Jupiter is no longer in a position to use a gravity assist to get to Saturn, and the trip time goes up again dramatically. So we either get Cassini going so that it can be launched in 1996, or a backup in 1997, or again we have to abandon the mission.

INTERNATIONAL COOPERATION

Senator **Fowler**. What about the international cooperation issue? What is the level of commitment of the Europeans?

Dr. **Fisk**. The Europeans will provide the probe for Cassini. We had an interesting question yesterday from Senator Gramm concerning the Soviet program. I think it's very interesting to note that when the Europeans had an opportunity to decide whether they wanted to join us in Cassini, the competition was a Soviet mission called Vesta to asteroids. And they elected to join with us.

Of course, my concern about the Soviet program is not so much what they do with themselves, but what they do with our European allies. They offer them an opportunity.

And so the Europeans elected to join with us. Of course, it follows that if we do not go forward with Cassini, they always have the option of going back with the Soviets to Vesta. But it's approximately a $250 million contribution from the European Space Agency to participate in the Cassini mission.

Senator **Fowler**. And they have voted that, have they not? That commitment has been made.

Dr. **Fisk**. They have committed to that. That is a firm commitment contingent upon our going forward with the program.

Senator **Fowler**. Just as a footnote, just an observation, Madam Chair, in these days as we debate FSX and the military side, we have two phenomena that we all agree upon. We've got the Japanese doing everything in their power to transfer enormous economic power into military might. We've got the Soviets under Gorbachev doing everything possible to transform enormous military power into economic power, and all looking at the Europeans for a combination of markets and cooperative teams to establish their goals; in one sense, the giant of the Pacific, the military goals; in one sense, the giant of Europe, and the Russians are using their European argument to achieve their economic goals.

It does seem to me that with the front-end commitment of the Europeans now, that we have an enormous opportunity, to use an underwhelming word, that will be lost if we do not take advantage of what we can gain and cement with our allies as a result of this kind of teamwork.

Dr. **Fisk**. I agree completely, Senator.

Senator **Fowler**. Madam Chairman, may I submit at this point in the record, a colloquy that I had with Senator Riegle on the floor of the Senate on August 9, 1988. And in the interest of everyone's time, I will submit other questions about other programs for the record.

Senator **Mikulski**. Without objection, so ordered.

Senator **Fowler**. I thank the Chair. I always try to come within my time.

Senator **Mikulski**. You're coming right under it. You're just sliding right into 3rd base there, Senator Fowler.

Senator **Fowler**. I've been called out before. I've learned how to do a hook slide.

Senator **Mikulski**. Senator Garn.

Senator **Garn**. Thank you, Madam Chair.

In last year's 1989 budget, Mr. Myers, as you know, one of the ways we solved that funding problem was a transfer of $100 million from DOD to NASA for shuttle operations, and also another $97 million for ALS system development activities.

What is the status of those transfers?

Mr. **Campbell**. They have been received.

Mr. **Myers**. They have been received.

UNIVERSITY SPACE SCIENCE AND ACADEMIC PROGRAMS

Senator **Garn**. With great reluctance, I'm sure, by DOD.

One of the concerns that I have, and I think the committee shares that concern, is the performance of our students in schools in math and science and the lack of training of math and science teachers. I think one of the things that disturbs me is we are getting dramatically behind the Soviets, the West Germans, the Japanese, not only in training scientists and engineers, but in the performance of out students. They do much better than ours do generally.

As you know, the National Science Foundation is also under the jurisdiction of this committee. They've taken the lead role in attempting to stimulate science and math education in the country, so I am pleased to note that your fiscal 1990 budget request proposes a new program line item for university space, science, and technology academic programs, with a request of $35 million, which is a substantial increase over last year. I believe it was $22 million in this year's budget.

Could you outline for the committee the general thrust of this effort to some extent; how you are coordinating your efforts with the larger NSF Program?

Mr. **Myers**. We are increasing that effort, Senator Garn, and we certainly agree with you that the young people need to be stimulated. We think the program that NASA has is one of the tremendous leverages of this country in stimulating young people to enter study of engineering and science, and we therefore think that our activities with the universities and grants and fellowships is an important part of this.

Len Fisk has come from the university area. I'd like to have him speak a little to that subject.

Dr. **Fisk**. Senator, if I might emphasize a point that Mr. Myers just made here. We are going to launch in the next 5 years, 36 science and applications missions in the highest launch rate in the history of the space program.

It is our full intent to conduct the largest, most public science and engineering lesson for the youth of the Nation that has ever been done. Each one of those missions is a sort of lesson in science, and each one of those missions is an engineering marvel. I think we have an opportunity every time we launch, to go forward to the people through public affairs activities, through our outreach to the schools, through every means we can to excite the youth of the Nation to considering science and engineering as a field that they should enter.

I think it's a rare opportunity, because of the concentration of science missions over the next few years, to have that activity and to produce the stimulation for the future.

EDUCATION TRUST FUND

Senator **Garn**. Mr. Myers, last year Congress also appropriated $15 million for a new science, space, and technology education trust fund which was to yield a continuing program funded by the interest paid on deposit of the appropriation with the Treasury.

In addition, we mandated that the first $10 million in revenue be set aside for the Challenger Center for Space Science Education, to establish a living memorial for the *Challenger* crew.

What is the status of the trust fund activity and the arrangements made for the grant to the Challenger Center and for other applications of the trust fund revenue?

Mr. **Myers**. Mr. Campbell will speak to that.

Mr. **Campbell**. We have invested the $15 million with the Treasury in Treasury notes. The first payment to the trust fund was in April of this year, in the amount of $250,000, and we received in addition about $90,000 that we will set aside for the NASA-directed grant activity; we plan to accumulate about $600,000 before we proceed to initiate the program that is being planned right now in our university affairs office.

We have pinned down some long-term interest rates recently for the next go-round at about 9.5 percent. So we expect the return to increase probably in the order of $350,000 per quarter. So we think at the end of the year, we will have applied the money to the *Challenger* fund, and in addition we will have in the order of $350,000.

Senator **Garn**. So the $250,000 has been paid the Challenger Center, and the other you have made no grants or application of those funds because you want to accumulate a larger amount.

Mr. **Campbell**. The plan is, Senator Garn, that we will accumulate on the order of $600,000, and then our annual expectation is about $300,000 in grants per year; that program is being developed now.

Senator **Garn**. I know that NASA did not like this provision when we put it in last year. However, I really do think—and the way you're handling it I think makes sense to accumulate it—I think you'll see some very good results from the expenditure of that interest. It is a one-time trust fund so there isn't any additional money to come from NASA, but even though there was disagreement, I think it will result in some very good applications of that money in the future.

Thank you, Madam Chair.

Senator **Mikulski**. Thank you.

First, I thought the conversation that just occurred on education and science was excellence. I had the good fortune last night of being at a bipartisan dinner sponsored by a leading environmental think tank on deforestation. One of your astronauts who just flew on *Discovery*, Colonel Hutchley, was there with his photographs, and not only was the description of what he saw in his photographs important—Senator Gore was there, and Senator Boschwitz—but he talked about how he is going around to the schools, and the reactions, and the way that boys and girls are galvanized.

I think we make a terrible assumption that because of *Challenger*, a teacher in space met her death, that it was a negatively traumatic event for our young people. Sure, they were affected by what they saw, but it does not diminish the interest.

I cannot encourage you enough to continue that kind of outreach to schools and, of course, I happen to believe that not all learning takes place in the classroom. The most interesting learning, particularly in science, occurs when people are out touching things, feeling things, experimenting with things, being little professors out in their own communities.

I would hope that NASA would really reach out to the service organizations that serve young people, like Scouts. I think if we had space scouts or science scouts, particularly if they were tied into working on badges, because we see where your projects are, the boys' clubs and the girls' clubs, the science fairs that are organized, I think it would be fantastic, because they're the ones that are out there.

Senator **Garn**. Could I just make one comment, Madam Chair, because you make such an extremely good point. The fringe benefit that I did not anticipate, or the role that I did not anticipate, having flown in space, was working in the schools. And I sometimes resent the fact that I have to spend so much time here, because I enjoy so much the schools of this country. There's never a recess in Utah that I don't go talk about space, and it's the only place you take a kindergarten through 6th grade and keep their attention for more than 30 seconds. I mean kindergartners, and this whole range up to 6th grade, with a grade school, and you can keep them quiet for 45 minutes talking about space. My greatest pleasure in life right now is talking about my space flight experience, not even high schools, but grade schools.

So there is something to be learned from that; that space can be an incredible carrot to revitalize the educational system of our country. So you are right on in your comments.

Senator **Mikulski**. Did you want to elaborate on that? I know Senator Garn talked about work force, but the way we attract our young people is through young people's programs.

Dr. **Fisk**. The point I would like to make is that an activity I am very pleased we are going to undertake this summer is having a Voyager encounter with Neptune, which is an exciting event all by itself. And NASA SELECT exists, of course, on every cable. Anyone with an antenna can get access to the NASA television channel. JPL has arranged to have a continuously running program that will essentially educate and allow any school system in the country, any museum, to tap into NASA SELECT and to participate in the excitement of a planetary encounter.

We are really making effort to encourage people to participate and join with us in that, because it's not only an historical event, but one I think that will be very stimulating to those people who join in with us on it.

NEW STARTS

Senator **Mikulski**. That is very, very exciting. When you hear about those, it's almost embarrassing to have to ask about these fiscally tough questions, like the new starts in an era of fiscal austerity.

Given the fact that funding the President's request for NASA will be difficult, one of the questions would be why should we fund new starts when we are so conscious of NASA's core, which you were talking about, Mr. Myers. Could you comment on the new starts?

Mr. **Myers**. Yes; the program that we have, the budget that we've asked for, $13.3 billion, is exactly what we had projected would be the fiscal year 1990 budget requirement when we projected it in 1989. In other words, we're meeting what we had projected in 1989. But within that, we have squeezed down enough other things to make room for two new starts. One is the CRAF-Cassini that Len Fisk has spoken of so articulately, a very important new start in science that really gives us continuity in our science program. Without it, our university base and the outside support to the science community in terms of analysis will wither if we do not start this new program, and it must be started this year in order to take advantage of the paths of the planets relative to its trajectory.

SUPERSONIC TRANSPORT

The other new start is an aeronautics new start, and it has to do with understanding better the environment within which a supersonic transport would fly. There is enough now understood about the technology of supersonic transports that it appears that particularly in the Asian route, where there could be as many as 300 aircraft flying at supersonic speeds, it looks like there may be a market, it looks like there is enough advancement in aeronautics that it is getting close to where a supersonic transport might end up being a viable commercial product that the industry could undertake.

But there are some limitations. As you know, presently supersonic transports cannot fly over land because of the sonic boom effects. There are some questions about ozone depletion at high altitude with supersonic transports, and the engine noise may still be a problem for supersonic transports in takeoff.

All these things are in this new start, for an investigation of the environment associated with supersonic transports. Can we reduce sonic booms? Can we reduce the ozone depletion question, or at least understand it? And can we keep noise around airports down?

I think this initiative is an important thing for this country to do, in light of NASA's traditional role of working ahead of the game in terms of potential commercial applications; it is one in which, if we are successful in finding means of giving an environmentally supersonic transport and at the same time doing some work in getting the most efficient supersonic transport, this Nation will be ahead of the rest of the world.

Senator **Mikulski**. As I understand, supersonic flight currently is the Concorde that's available.

Mr. **Myers**. Yes—at Mach 2, two times the speed of sound.

Senator **Mikulski**. Which has certain environmental comments, the noise and so on. And then, as I also understand, it is rather heavily subsidized by the governments that operate them.

Mr. **Myers**. Yes; they have never recovered the original development costs of the Concorde.

Senator **Mikulski**. But that the Concorde is an aging airplane as of now, and then those nations will have to decide whether they'll replace them. And they have been working on new, I presume, supersonic aeronautics.

Mr. **Myers**. The European nations are studying supersonic transports now.

Senator **Mikulski**. Whether they're going to replace it, improve it?

Mr. **Myers**. We just don't know. I don't think that they can improve the Concorde to make it a commercially profitable business or one in which it is competitive price-wise, ticket price-wise.

What we're looking for is whether there is a configuration that can be environmentally acceptable and compete at reasonable prices.

Senator **Mikulski**. What is the airplane manufacturers or the people who would profit from this, what is their contribution to this?

Mr. **Myers**. They would be the ones that would build it.

Senator **Mikulski**. What is their contribution to the research? Have they talked about some type of cooperation?

Mr. **Myers**. I'd like to have Bob Rosen come forward on this. I know we've had continuous communications——

Senator **Mikulski**. Why should we pay for the development of an idea from which they're going to make money without a contribution from them in some way?

Mr. **Myers**. Let me go back to the position we're in in aeronautics. The objective of NASA's aeronautics program has always been to reach ahead of the rest of the Nation in research that then can be applied by the industry to commercial transports. And it's been an extremely successful partnership.

The relatively small amount of money that NASA has put into this effort has led to the world domination in commercial transports by this country.

Senator **Mikulski**. But how much would you be talking about, Mr. Myers, for this endeavor?

Mr. **Campbell**. The budget request we have is $25 million the first year. And over the course of this phase of the program, it's $284 million.

Senator **Mikulski**. So, $284 million, and then we would be out of it?

Mr. **Campbell**. The $284 million is to look at the environmental impacts and the changes that we would have to make in technologies in the aircraft to make the environmental impacts as small as possible.

Senator **Mikulski**. And of that $284 million, how much has the private sector talked about cooperating with us, or would we be expected to pick up the whole bundle?

Mr. **Campbell**. The $284 million would be our contribution. The private sector contribution would be a relatively small percentage of that, Senator Mikulski. What we're talking about is some very fundamental long-term technologies, and typically that's the kind of thing that the Agency has done, and it's not the kind of thing that the industry has done.

When we get to the point when these things are in fact resolved and it's been proven that an aircraft of this type would be economically feasible, then the industry will jump in with both feet.

Senator **Mikulski**. And do what?

Mr. **Campbell**. And develop the aircraft. We're not talking about development at this point.

Mr. **Myers**. Then industry would put billions into it if this technology effort proves a path that they can take commercially.

Mr. **Campbell**. We're not talking about developing an aircraft. It is not the Agency's role to do such a thing. We want to look at the technologies that would affect how the aircraft would eventually be developed by the industry.

Senator **Mikulski**. So you're talking about $284 million over what period of time?

Mr. **Campbell**. About 6 or 7 years.

DEEP SPACE MISSION

Senator **Mikulski**. Let's go to the cost overruns in the deep space mission. Last spring, GAO issued a whole series of reports about the failure of NASA to maintain schedule and cost targets on its deep space flights. For example, the Hubble Space Telescope's original development was supposed to be $600 million. Today it's $1.6 billion, a growth of over 150 percent.

Could you comment on the GAO remarks, the Hubble Space Telescope and what steps we're taking to prevent these future science projects from having these same kinds of cost overruns?

Mr. Myers. We've had great difficulty with this area because of the Challenger accident. So many of these payloads were expected to be launched on the shuttle sometime ago, and many of the payloads have been waiting for either an expendable launch vehicle or the shuttle for 3 years.

These are very delicate payloads and have to be enclosed in a clean room, monitored, operated, updated, and it has been an extremely expensive process. We certainly have every intention of meeting our schedules on these flights because it is true that if you miss schedules it costs money.

We have been very pleased with our ability here. For example, 1 year ago, we projected that we would meet the first day of the window for Magellan with the shuttle and we did meet that first day. We didn't launch. We got to 31 seconds from launch, but we were ready to launch on the first day of that window.

So even though Magellan had to sit on the ground waiting for us to get back in business again with the shuttle, we're now in the position where we can start clicking off these flights.

For the Hubble Telescope, we did have some difficulties in the development program, we did make some management changes, and we have brought that under very tight management since that time.

I'd like Len Fisk to talk briefly about that.

Dr. Fisk. Yes; let me just say, as Dale said, that the principal cause of all of our cost overruns has been schedule. If you look at the Galileo project, and at Magellan, in fact it's kind of an interesting number. If you ask what the consequence of a Challenger accident was for space science, what it has cost us to keep the missions on the ground over this last 3 years, it's in excess of $1 billion.

On the positive side, not a single science mission was lost. We didn't cancel any major flight programs. They are all going to fly in this period of activity that comes in. But nonetheless it has been a costly exercise.

Now, in terms of future, how do we protect ourselves? The first thing you do is have a mixed fleet. You make sure that you are not dependent on one single launch capability. You need both the shuttle and expendable launch vehicles, and we are committed to doing that.

The second thing you do is assure tight management in the projects. We have a philosophy in OSSA these days that we prenegotiate a descoping plan with all of the science instruments in the event that they have cost overruns. And we do our best to maintain the schedule, and I think so long as we do that we will not experience overruns in the future as we have in the past.

Dr. Hinners. Madam Chair, if I could add to that, because I have some concerns, frankly, along these lines. Part of our ability to manage a mission well and indeed be responsible to the taxpayers of this country depends first upon knowing what we're getting into. Our advanced technology development in the Agency is the key to preparing ourselves for the future.

It is that very area that has suffered very much over the last 15 years, and one we are trying to rejuvenate through the Civil Space Technology Initiative and the Pathfinder program. Without doing that advanced technology, you commit to missions when you're not really prepared to commit. So it is very important that we really look closely at our technology preparation.

The second area is personnel. It is critical that the Agency have the talent internally—I mean in engineering, in procurement, in science, across the board—to do the job of managing the taxpayers' money. I am concerned that we are in a weakening position in the Agency institutionally.

We've heard over the last few days about the tight budget for our programs, and it is absolutely true. Our institutional budget is tight. This is the first budget in the history of this Agency where we do not have adequate funding for the people we are authorized. We are cutting our training internally. We are deferring maintenance. We are not automating some of our cost accounting systems. We're deferring that. We are contracting certain activities that ought to be civil service functions, in a charade of saving money and to have smaller Government. We are not building some of the research facilities internally that we should be building.

I am seriously concerned about the direction, the trends of the internal capability of NASA. We are in danger of approaching what I would call a DOD mode of project management, whereby you look to the aerospace as the Midas of the world to manage your projects. I don't think that is the right way for NASA.

NASA's history is one of having a talented internal civil service work force, and we must pay attention to that and we must redevote our efforts toward maintaining that, to getting the new people coming in. We're going to be losing a large number of people to retirement over the next few years. We've got to now be bringing in the young folks who will be mentored by these people, get that transfer of information, start to transfer that experience as we go on to new projects in the Agency; and we should go on to those new projects.

You asked about the importance of the new starts. It is with some chagrin that I sit here and listen to my compatriot, Len Fisk, talk about launching Space Telescope, Gamma Ray Observatory, UARS, Magellan. These were all projects which I was lucky enough to help initiate 10 years ago. So the importance of that new start is critical.

If we are going to have missions in the mid-1990's on into the 2000's, we need to start those now to keep this continuity of flow going. But overall, we have some major challenges in our institution; our capability is on the hairy edge there. We've got to be sure that we don't neglect it as we look to the future.

And we should indeed size our institution for further programs. Some would ask at times, if you're worried about your ability to do these programs, shouldn't we cut the programs? I say that's backwards. We must make our minds up what program is right for the civil space program of the country and then size our institution to support that program.

Senator **Mikulski**. Dr. Hinners, that was very well said, and I think it parallels the thinking of this committee. I'd like to take this opportunity to thank you for the contributions you've made to NASA, to Goddard, to being at headquarters.

I think what I would appreciate for the record, and I know Senator Garn is passionately interested in this work force readiness, if you will, or work force needs. And we would really like if you would submit for the record a commentary on what you think the work force needs of NASA are over the next decade and what we need to do to retain our civil service and also be able to recruit those professionals, some of the things that we had talked about yesterday. That would be most welcome.

[The information follows:]

WORKFORCE REQUIREMENTS FOR NEXT DECADE

NASA's workforce requirements for the next decade can be condensed into two major categories. First, we will be addressing and correcting a serious erosion of our in-house capabilities that has happened over the last decade. The intense reviews of NASA that have occurred since the Challenger accident have highlighted the need to keep a strong technical staff to perform the Government's role. We have identified additional Civil Service staff needed to keep a strong in-house capability for major long-term research; to maintain the proper emphasis on safety, reliability, and quality assurance; and to be a smart buyer of major contractor efforts. In fact, under the terms of the Federal Managers Financial Integrity Act, we have identified contract management as a material weakness in NASA due to an insufficient number of people to adequately review the performance of our many contracts.

Second, we will be experiencing increasing numbers of retirements of people who entered the service in the 1960s, and who leave major holes in the fabric of the agency when they depart. There is a shortage within the agency of experienced people in the next age groups. We will need to devote about half of all our hiring to experienced scientists, engineers, and administrative specialists across all of our major disciplines.

To address what we need to do to recruit and retain our Civil Service staff, one may boil it down to two issues, which are challenging work and fair compensation. NASA depends on its mission and reputation to motivate people to work for us, people that want to do research and engineering, not just write contractual documentation. The strongest magnet we can have is the opportunity to shape national programs that have the enthusiastic support of the public and Congress. A clearly articulated vision of the long-term objectives of NASA will excite our technical staff, will hold their allegiance to the program, and will recruit the next generation.

However, aerosapce companies also use the draw of NASA contracts to attract talent. It is clear that the gap between compensation in the private sector and compensation in the Government is now too large to be overlooked or to be irrelevant to people's career choices. Many experienced executives, mid-career prospects, and new graduates simply refuse our job offers because the pay is too low. I urge Congress to work with the agencies and the Office of Personnel Management to address this issue.

COST OVERRUNS

Senator **MIKULSKI**. If I could come back, really what you're saying is the cost overruns, part of that was due to the fact that the *Challenger* went down, and the space science projects have to be made, and it's not like you can just stick them in a rented warehouse somewhere. They have to be in a preservation environment that is expensive to maintain because of just air quality and so on. And that costs about $1 billion. And you also had to maintain a level of personnel.

Then you talked about the need for a mixed fleet so we're not relying only a manned craft. This then takes me to this year's budget request for expendables, which is about $170 million. How does this tie in with, say, the shuttle spares, because what we heard yesterday was that shuttle spares were eliminated. Are we just kind of juggling here, like those Chinese acrobats, or are we facing up to our fleet needs, our fleet launch needs?

Mr. **Myers**. We did look at that very carefully, Madam Chair. The balance for this tight budget that we have is about right. We do have the start of some spares for the shuttle, not as much as we should have. We have the funding for our expendable launch vehicles, not as much as we should have. But all of those things were part of the crunch that we had in this budget reduction.

Very frankly, if the Titan IV, for example, had been offered to us in this time period, we would have had a very difficult time paying for it because we were using the Titan IV as a backup, and the program should have backups for robustness. But with our budget as tight as it was, we felt that when the Air Force said they needed that Titan IV to help in their program schedule delay issues, we didn't fight too hard because of the budget crunch that we were in.

So I think we've got a balance between the shuttle budget and the expendable launch vehicle budget that is keyed to approved missions. We only buy for those missions that have been approved.

STRUCTURAL SPARES

Senator **Mikulski**. I'm concerned that we are going to start skimping on the wrong things—Senator Garn and I were just commenting just like in DOD, there's not the spare parts, the gasolines, the spark plugs—that we could end up in the same situation with NASA.

It's not only spare parts, but again we go back to NASA's core. Your launch capability is part of your core. And you need a mixed fleet. Some you need the shuttle. Some you could do with an unmanned craft to keep us flying.

Mr. **Myers**. We do have sufficient spares for the shuttle in almost all cases. We have about $300 million of spares in the program for the shuttle. The thing that Admiral Truly was talking about yesterday is the structural spares, and that's very important because if we bend a wing or break a tail or something like that in moving the vehicle around, you need those structural spares, too. The previously acquired structural spares turned out to be extremely important to the time schedule for building the replacement orbiter.

So one of the reasons for the structural spares is to support—I'll call it minor damage to the shuttle—but also to support the opportunity to shorten the lead time on construction of a new orbiter if that comes about.

Senator **Garn**. Is the new orbiter eating up a lot of the structural spares that you had? That's where we started building them.

Mr. **Myers**. That's where we shortened the lead time by having those structural spares available.

Senator **Garn**. Right; but they were supposed to be available for other orbiters. Has Atlantis been doing any cannibalizing to get up? Have you taken anything off Discovery or Columbia or so on to get Atlantis up this Thursday?

Mr. **Myers**. For things like computers, pumps, and cockpit instruments, elements of that sort, we have a much better spares position than we had prior to Challenger. I don't think any operations guy ever feels that he has enough spares, but we have not cannibalized very much in our operation. Once in a while we have, but very rarely, and we watch that very carefully. Cannibalization has gone down dramatically since pre-Challenger.

Senator **Garn**. The reason I brought that up, Madam Chair, is I used to fly airplanes. You could have seven or eight sitting on the ramp and only one was flying because you had taken parts off the other seven or eight to get that one in the air.

Senator **Mikulski**. Senator, it's your turn now for any questions you might have.

SPACE STATION POWER REQUIREMENTS

Senator **Garn**. Just a few brief ones, getting into some detail. The total requirement for power for the space station is 75 kilowatts, and I think you divided that up, 45 kilowatts for space station users and 35 Kw for housekeeping.

Has there been any change in that distribution? Do you feel that 75 Kw is adequate for the station?

Mr. **Myers**. I do. I feel that it is adequate for the station.

Senator **Garn**. And the distribution is still the same?

Mr. **Myers**. The distribution is still 30 Kw for housekeeping. Now, there are a lot of people that would believe that there could be more use. I guess the way I look at it is that with the budget the way it is, we really ought to stay at the 75 Kw until we fly.

Then we do have scars on the space station, what we call provisions for adding power in the future if that turned out to be a requirement.

INTERNATIONAL AGREEMENTS

Senator **Garn**. We've talked a great deal about the obvious and what I think are disastrous implications if the space station had to be canceled. I don't think a lot of people are aware of all of the cooperative agreements we've signed.

What impact would that have on the agreements we've signed with partners in the project?

Mr. **Myers**. As you know, we have worked out over a period of about 4 years, a very formal set of agreements with nine European countries combined in the European Space Agency, with Canada and with Japan. Cumulatively, those international agreements add up to over $8 billion in the development program and a share in the operations costs of the space station. So just from a financial standpoint it's very important.

But I think, more dramatically, each of those nations has had approved budgets for starting the development of the modules that will be associated with the station. Each of them are underway. The Canadians are ready for their preliminary requirements review on the big arm that they're going to have for the space station. The Japanese have mockups in place. The Europeans are involved.

I think canceling the space station would be an absolutely terrible international cooperation issue. Our commitments are heavy in this area. I think that we would certainly demonstrate without doubt that we are an unreliable partner in space activities.

Senator **Garn**. That would be my next question. Not only the immediate impacts, but what would it do for the future of attempting to negotiate any long-term scientific agreements with other countries? And I think you've already answered my question. We wouldn't be very trustworthy, and why should they commit a lot of dollars if we don't go ahead with what we committed to do?

Mr. **Myers**. They have already started to spend money, and if we were to cancel, it would certainly be an indication that they should look very hard to other spacefaring nations for their cooperative programs. I think it would be very powerfully negative with respect to agreements that we have in areas other than space with the international community.

TILT ROTOR TECHNOLOGY

Senator **Garn**. Looking at tilt rotor technology, obviously NASA spent a lot of time talking about that, and now DOD has decided not to go ahead with the OSPREY. Do you see any commercial application for tilt rotor technology?

Mr. **Myers**. We have an agreement with the FAA to work with them on the commercial application of tilt rotors. In the 1990 budget, I think we have $4.9 million, to look at the commercial applications. The problem is that it is a high technology program and the OSPREY would have given a tremendous lead in that activity that the commercial operations could follow. And if the OSPREY is canceled, I think it's going to set back tilt rotors dramatically relative to commercial applications.

SHUTTLE OPERATIONS

Senator **Garn**. Are your shuttle operations adequately funded and staffed for 1989, or are you going to have to come back with reprogramming or a request for a supplemental?

Mr. **Myers**. As I said, we had to cut one flight out of the shuttle program. We certainly are not going to do anything that would affect the safety of the operation. We will never go thin relative to our personnel and activities associated with issues of safety on the shuttle.

What we did when we were squeezed was to cut one flight out. That means some science mission is going to be delayed and some other additional costs will be incurred relative to that. But we didn't have any choice. That's what we had to do.

But I will say that I have been really impressed with the organizational response to the problems as they occur on the shuttle. We've got an outstanding management team on that operation, not only technically, but from an operations standpoint down at the cape, and they have done superb work with the shuttle, and we are really pleased with that.

Senator **Garn**. Dr. Hinners, let me compliment you on your statement. It's nice to hear a direct, precise, candid assessment of the situation and, believe me, that will be extracted from the record, and I will add that to my list of quotes when I'm talking about this problem.

I realize you're leaving and I regret that situation. I would encourage those who—don't misunderstand, Dale; I'm not talking about you—but I would encourage those who are not leaving, to be just as direct in their assessment of this problem, because if the people at NASA are not direct, you're not going to have jobs anyway because the Agency will have to be restructured as you mentioned. So I would suggest none of you be intimidated by sitting there as witnesses. We want to know what it's really like and what the real situation is, or we're not going to be able to help you solve the problem.

Madam Chair, the rest of my questions are getting much more specific as they go along, and I think would probably be better answered in the record than taking the time of these gentlemen to get into the specifics of various programs.

MISSION TO PLANET EARTH

Senator MIKULSKI. Thank you very much, Senator Garn. Your questions will be incorporated into the record.

I have two areas of questioning. One will be on work force, but the other is related to the mission to planet Earth and the Earth Observatory System.

I understand you included $24 million for an advanced instrumentation and data system analysis for the EOS, which is the centerpiece of NASA's mission plan. Let me tell you where I'm going. I need you to describe for the committee the basic components of this proposed mission, what kind of new start cost it would have, and what its total development costs will be.

Mr. MYERS. The program has been under study for some time, Madam Chair. There has been a lot of work within the various departments of the Government looking at the whole issue of how to go about gathering the data, getting to the place of analyzing it, and helping with enough facts to the point that people can make decisions relative to the future global climate.

That's not going to come easy. There is a lot of work to be done over a long period of time, I'm sure, to develop the data base, the analysis systems and so on. But there is a lot of good work going on to develop that. We do not yet have a mission to planet Earth as an approved program, and we are still studying the various elements that could make up such a program.

Len Fisk has been in charge of the activities at NASA relative to that, working with the other agencies of the Government in developing a program. I'd like him to speak to that subject.

Dr. FISK. Let me cover a number of things if I may, Senator. Please don't let me get carried away here.

Senator MIKULSKI. Enthusiasm is contagious.

Dr. FISK. We try within space science, as you know, to lay down a strategy and a plan that we are going to follow. Our plan calls for the initiation of planetary missions this year. Our plan calls for the initiation of the Earth Observing System next year as a 1991 new start.

As part of that plan, as with any new start, you go through a series of phases of getting ever more defined in your definition of what the mission is, and we are currently in what is called the phase B for the Earth Observing System, leading to what would be the new start, Phase C/D in fiscal year 1991.

This summer, there is something called the nonadvocacy cost review where we actually sit down and decide what the cost is going to be.

The mission as it is planned consists of essentially three parts. It consists of instruments on the polar platforms of space station, it consists of attached payloads on the manned space station, and it consists of a small program called Earth Probes. There are some missions which require neither a polar orbit nor equatorial orbit, but which need an orbit that's unique to them; the idea is to have those missions in a small program on expendable launch vehicles called Earth Probes.

Central to this, as you pointed out, is the data system because the mission is only as useful as the data can be made available to people to both make models and predictions of it, and in turn get it into the hands of the policymakers who are going to try and use this data to set sound policies for the future of the Nation.

We in fact have used the data system as the driver. The data system entered phase B before any of the instruments did, and is currently further along in that activity. The program is large. As I am inclined to tell people, it comes in three sizes: Big, bigger, and biggest. The question is how far we go beyond big.

Senator MIKULSKI. Tell us about how big is big and how big is bigger?

Dr. FISK. Not even I have the courage to tell you about biggest. [Laughter.]

Senator MIKULSKI. Oh, come on. You're up for it.

Dr. FISK. In the case of big, it consists of instruments on a single platform of space station, with the idea being to acquire 25 years' worth of data from this, because you're looking for very subtle trends.

In order to have 15 years of data, we will have replacement platforms. We will launch a platform. That will have a design life of 5 years. When the major instruments on it begin to fail, we will send up another platform to replace it and so on over the 15-year lifetime.

That, plus the attached payloads on the manned Station and the Earth Probes, is estimated to have an annual cost of about $600 million a year and to stay that way for some years, due to the plan for replacement platforms; therefore, it would involve a level of effort program running at the $600 million a year, plus.

The scientists make a very convincing case that not all the instruments you need to be able to study the Earth and to have the data can be flown on a single platform. There are simply more things that need to be known to build accurate models, to make accurate predictions.

And so bigger consists of a second platform with a separate set of instruments, and of course the cost goes up higher to perhaps in excess of $1 billion per year.

Biggest includes geostationary platforms, but those are only in a very preliminary design state. The idea would be that if you really understood how the Earth was changing, you would get what preliminary data that you can from a polar orbiting spacecraft with the Earth rotating underneath it; then, you may in time want to look at a single region of the Earth continuously, and for that you would need a geostationary platform. We would not envision doing that until near the end of the century.

Now, it is important to note that in this mission with the polar platforms and the attached payloads on the space station, integral to this is the infrastructure that the space station gives you with the polar platform and the attached payloads.

Senator **Mikulski**. That's what I understand. The polar platforms would be involved with the space station.

Dr. **Fisk**. We anticipate that the polar platform structure itself, the bus, is provided to us by the space station program, and there are attach points on the manned space station where we would fly our instruments.

Senator **Mikulski**. So when one talks about the space station—and we go back to Senator Kerrey's comments in terms of selling, if you will—not selling it in a cheap sense, but really demonstrating the benefits of the space station—we won't be doing Earth observatory truly without a space station.

Would that be accurate to say?

Dr. **Fisk**. That is correct.

Senator **Mikulski**. And for those who, like myself, feel that probably one of the most exciting planets that we can study is ourselves, the Earth, the mission to the planet Earth—the other is that as we enter into these very difficult conversations now about air quality, I mean they're talking about draconian efforts, international activity in this area with ozone. The colonel spoke eloquently last night about what they've observed in deforestation and changing weather patterns that impact upon agriculture and forestry and things that are related to economics. I think this is going to be one of the really more important things that we're going to do.

Dr. **Fisk**. Senator, if I may add, when we talk about the cost of this program, we ought to also talk about the cost of getting the wrong answer. If you think about the economic dislocation that could occur from either taking the wrong steps to protect the environment, to protect the planet, or not taking any steps at all, the costs of that are enormous. These are simply data that we need to have if we are to make sound decisions on the future of the economy and the future of the planet.

INTERAGENCY EFFORT

Senator **Mikulski**. I spoke to Administrator Bill Reilly of EPA. I keep wanting to call him Secretary Reilly because maybe that's what is going to happen to him. I was talking about the role of EPA in this, and it seems to me that folks haven't really focused on an interagency effort.

Could you tell me what NASA is doing to work with other agencies, particularly EPA and the National Science Foundation, which is in this committee, to fully integrate the mission to planet Earth into not only scientific issues but global warming and the kind of ways that we are ultimately going to involve our citizens in this activity? What the kids would love to study.

Mr. **Myers**. We have had a continuing and I think a very good interagency communication going on. I've been the representative on the Committee for Environmental Systems that looks at the global climate issues of the country and has been working from a policy standpoint to develop the responsibilities of each of the different agencies that are involved. And there are many—Agriculture, Interior, EPA, Commerce with NOAA—all are involved in this activity.

NASA's part is the gathering of data. Obviously, because of our background in data analysis, we will be involved with NSF in the data analysis issues. The other parts are being developed in their own activities, and we work very closely with EPA in this area.

Len, do you want to comment on that?

Dr. **Fisk**. Let me make one point if I may, Senator, which I think is important. There are a lot of agencies that need to be involved in this—the NSF, NASA, USGS, Agriculture, et cetera. But one distinction that needs to be made is that there should be a clear separation between those who are doing the research and those who are setting the policies.

You never want to get in a position where the research is being driven by the policy. You want to have an unbiased answer. You want to know what the future of the planet is going to be, and no one should ever accuse you of having presented an answer which is acceptable as opposed to one which is factual.

So the agencies that are involved in the research—NASA, the NSF, the USGS, NOAA—have a close cooperation on this. And there are, of course, separate agencies like EPA and Department of the Interior, Department of Energy, which, although they have small research efforts, have as their main function taking that data that comes from the research and translating it into policies concerning what people should, in fact, do.

We are doing our best to make those separations and to make that a cooperative separation; but, nonetheless, there is a real distinction between the research and the policies.

Senator **Mikulski**. I think your points are well taken, Dr. Fisk. It is my hope we will even hold a separate hearing on this. We are going to try to accommodate Senator Garn's request on a separate hearing on the advanced rocket issue that he raised.

Then, once we go through our first, kind of trot around the track with our 302(b), to make sure you've got the core, we'd like to come back to some of these.

I would like to congratulate you, Dr. Fisk, on the strategic plan that you have of Office of Space Science and Applications. When I talk about a strategic plan, I'm not talking pie in the sky and so on. This is what we're talking about, which is so helpful, I think, for the committee because your navigational chart, if you will, to say where you would like to take NASA in this area, and we would hope that ultimately NASA would have a strategic plan for itself.

But the issues that you raise are why we look forward to the President appointing his new science adviser, because I think this is where the integration will come between policy and science.

WORKFORCE AVAILABILITY/RETENTION

I have one last question. We spoke about work force availability and retention. One of the areas, of course, that's of interest to me is the employment of women and minorities. Dr. Hinners, could you tell me what percentage of the work force at NASA is composed of minorities and how many are in GS-12 and above positions?

Dr. **HINNERS**. Madam Chair, Harriett Jenkins who heads our Equal Opportunity Office, is here and can give you the specific numbers. But I would like to start by stating that we are making a very active effort to involve more women and minorities in our work force and are having quite a bit of success. But we also are seeing, particularly with regard to minorities, that the problem must be addressed right back in the grade school, pregrade school almost; that the pipeline, as we call it, just does not have sufficient minorities and women coming up through the engineering and the science areas to fulfill our needs and our desires.

We fully recognize in the Work Force 2000 report, that by the end of this century, 85 percent of that incoming work force is going to be women, minorities, and immigrants. So we are very concerned about it and are working to try to fix that.

Now, if I could call on Harriett Jenkins.

Senator **MIKULSKI**. Hello.

Dr. **JENKINS**. Good morning, Madam Chair.

You asked about the number of minorities in the total work force at NASA, and that number stood at 3,213 on Sept. 30, 1988. They made up 14.6 percent.

Senator **MIKULSKI**. And how many are in GS-12 positions or above?

Dr. **JENKINS**. We will have to submit that for the record.

[The information follows:]

There were 1,355 (9.9 percent) minorities at the GS-12 position and above level.

WOMEN AND MINORITIES

Dr. **JENKINS**. I can tell you that the GS/GM-14 and above, there were 331 for 6.4 percent of the work force. And I should give you a figure for women and minorities.

Senator **MIKULSKI**. Yes, I'm going to ask that as well.

What percentage of your total work force is comprised of women and how many are in GS-12 and above?

Dr. **JENKINS**. The total number of women at NASA is 6,153 as of Sept. 30, 1988, some 27.6 percent, or almost 28 percent of the total work force. At GS-12 and above, there were 1,801 (13.2 percent); at the GS/GM-14 and above, there were 289 women, or 5.6 percent of that group.

Senator **MIKULSKI**. So the management really falls off.

Dr. **JENKINS**. It does. But if you take managers and supervisors as a group, there were some 213 minorities and there were 232 women. Now, there is a little bit of an overlap in the count there, but for minorities and women there were a total of 406 managers and supervisors at NASA.

Senator **Mikulski**. I think what Dr. Hinners is saying, and you would agree, that in terms of overall recruitment now and in the future, there is difficulty because of the so-called available pool. Then we have to talk about expanding the pool for the year 2000, one of which will be scientists and engineers generally for the country and those who are willing to come into civil service.

When you say you are working actively on that, what does that mean?

Dr. **Jenkins**. It means that we are utilizing a variety of outreach activities to try to get to young people to encourage them to take science and engineering degrees. We have programs that are aimed at elementary level, at secondary school level, and at university level.

We use programs such as our summer high school apprentice program to identify talented youngsters at the secondary level. We are planning to also support them at their freshman and sophomore years and get them into co-op programs or into junior fellowship programs.

Senator **Mikulski**. What has been the response to your outreach?

Dr. **Jenkins**. Do you mean out in the communities at large?

Senator **Mikulski**. Have the kids kind of signed up?

Dr. **Jenkins**. Absolutely; we have a number of people who would like to get involved with NASA, a number of agencies and organizations who request help and support. We also get involved in the historically black colleges and university efforts and attempt to support youngsters and develop them at the graduate and undergraduate levels there as well. So the response is very, very good.

Senator **Mikulski**. Well, we want to encourage you in the most aggressive way and to be sure that there are the resources to do this outreach because it's so critical.

One of the things that we're observing is that this is really—we're moving to a national crisis in this. That's No. 1. No. 2, we see an issue of recruitment even in my own area that I have responsibility for, which is the appointment of young men and women to the military academies of the United States. It has been my observation that most of the kids are coming out of the suburban schools in Maryland.

Then when we look to minorities and women, they again come out of suburban schools or in urban areas, the specialized high schools that have focused, whether they're the special magnet school or whatever. I'm on the Board of Overseers at the Naval Academy. They're facing the same situation. The military academies have reached out for communication with the black caucus and the hispanic caucus. Some of them have only 15 kids applying to them. In Baltimore City last year, only 15 kids came to Senator Mikulski for the possibility of and applying to West Point, Air Force, or Naval Academy. But statewide, I was flooded.

I don't want to go through every little detail, but two suburban areas like Howard County, which is a rather integrated county, the girls were there, high SAT's, and those wonderful black kids, some from military families, or over there working at Bendix, are all set to try and get in, and in Baltimore City it was a bust. That's where we have to be recruiting. That's where we hope to be working with Mr. Cavazos and you.

It's not the subject of this hearing. When I ask these questions, I'm trying to get a state of where we are. We want to just encourage you in what you are doing. We also hope that where you have good people, you promote them; and that women and minorities don't feel the glass ceiling that they often feel in the private sector.

Did you want to comment on this, because we are really putting our thinking caps on, on how to get people interested in science. We find they drop off when they're about 11.

Dr. **Jenkins**. I couldn't underscore more strongly what you have said. We've been concerned about it for some time and feel that the overall educational programs have to be improved in the teaching of math and science, and particularly in schools where there are large numbers of minorities.

There has been a National Task Force on Women, Minorities, and the Handicapped. The Federal R&D agencies which have attempted to get together and make recommendations of what might be done in planning for——

Senator **Mikulski**. Do you have your recommendations ready?

Dr. **Jenkins**. Yes; we can submit those to you.

Senator **Mikulski**. I want them absolutely.

[The information follows:]-

Women and Minorities

Attached is a copy of the interim report, by the Task Force on Women, Minorities, and the Handicapped in Science and Technology, "Changing America: The New Face of Science and Engineering."

SUBMITTED QUESTIONS

Senator **Mikulski**. I know that Senator Kennedy and Orrin Hatch are keenly interested in that over in our Labor and Education Committee. Senator Durenberger and I are going to be heading up a Task Force on Work Force. Our Treasury, Post Office, and Civil Service is interested in this. I would really welcome your recommendation. Maybe it's going to be one task force we pay attention to.

Senator, did you have any other questions before we wrap up?

Senator **Garn**. No; I don't. Thank you.

Senator **Mikulski**. I would like to thank everyone for their participation in this most interesting 2 days of hearings. For those who are staying, I think you get a sense that we want to keep on flying. For those who are not, we want to thank you, Mr. Myers, Dr. Hinners particularly, for your outstanding contribution and the restoration of not only the *Challenger* flying, but this morale, this energy that I spoke about when I was at many of the facilities, because ultimately our people drive the technology; the technology doesn't drive the people.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED BY SENATOR BARBARA A. MIKULSKI

Overall Budget

Question: Even though OMB reduced your request by over $1 billion, it is still close to the level that you projected it would have to be to fully fund the program which we appropriated $10.8 billion for last year.

If we fully fund your $13.3 billion request in FY 1990, what would be your projected "run-out" costs for that program in FY 1991 and FY 1992?

Answer: The projected run-out cost of the FY 1990 program is $14.6 billion in FY 1991 and $15.7 billion in FY 1992.

Question: Do these run-out costs include funds for any new initiatives, like the Mission-to-Planet-Earth or the Shuttle C?

Answer: The run-out of the FY 1990 budget request does not include any new starts after FY 1990.

Question: If we included just those two initiatives in FY 1991, what would you estimate they would add to NASA's budget costs in FY 1991 and FY 1991?

Answer: Based on preliminary planning estimates the funding for Shuttle C would be $80 million in FY 1991 and $400 million in FY 1992. This plan assumes a constrained phasing of expenditures in the first few years, based on a mid-1990s availability.

The "Mission to Planet Earth" program described in the Sally Ride Report was a very preliminary concept study of a possible future mission. Two possible candidate programs for the Mission to Planet Earth are the Earth Observing System (EOS) and Earth Probes. These programs, which would both be major components of the Mission to Planet Earth concept, are possible FY 1991 candidate new starts in Space Science and Applications. The EOS would place a suite of instruments in polar orbit to make comprehensive observations of the Earth and is currently in the definition stage with program requirements, capabilities, schedules, and resources estimates being reviewed. As presently conceived, the EOS would use the polar platform spacecraft being developed under the Space Station Freedom program with initial launch of this platform anticipated in late 1996. Based on preliminary planning estimates the funding for the EOS instruments would be $125 million in FY 1991 and $400 million in FY 1992. Earth Probes, which are a series of explorer-class missions in Earth Science to allow for continuous coverage of key Earth observations, would be planned to build to a $40-60 million level-of-effort per year. These proposed programs would need Administration approval and would not necessarily compete with funding for other agency requirements.

Question: Is it realistic to expect such large increases in the coming years when domestic discretionary spending will grow by just 2.5 percent above current services?

Answer: The NASA FY 1990 budget request and runout reflects the President's priorities within the limits for domestic discretionary spending. Many of the programs in the NASA baseline involve "bell shaped" funding patterns associated typically with complex technological research and development programs. These programs require long term commitments that in specific cases require increased amounts above overall growth. That is the nature of these complex programs. The runout estimates are developed on a program by program basis rather than an assumed overall funding growth rate.

Question: As you know, NASA's fate rests largely on the size of our 302b allocation. What steps are you taking to enlist the personal support of the President and the Vice President to make members of this Committee aware of how crucial our Subcommittee's 302b allocation is for NASA's future?

Answer: The President and other members of the Administration have made many public statements of commitment to the funding levels in the FY 1990 request. The Director of OMB understands the 302b process, and the amounts involved. He, together with other members of the Administration, fully support the budget request for Science, Space and Technology.

Question: What would NASA's position be if the Subcommittee adopted a "no-new starts" policy in FY 1990 because of the Gramm-Rudman targets and would such a policy affect any of NASA's ongoing core programs adversely?

Answer: Nearly all of the NASA budget request is needed to carry on programs already approved by Congress. If the Subcommittee adopted a "no-new starts" policy it would of course affect the two new initiatives proposed in the President's FY 1990 budget request - CRAF/Cassini and the High Speed Civil Transport initiative. Although the deletion of these new initiatives would have no effect on the on-going program it would be contrary to meeting important objectives of the Nation's space and aeronautics programs. Deletion of CRAF/Cassini would deal a heavy blow to outer planetary exploration, an area in which the U.S. continues to hold world preeminence. Deletion of the High-Speed Civil Transport effort would deny the Nation technology important to our future in the world aviation markets.

Question: If we are to move forward with any new starts in FY 1990, where would you suggest we find the offsets within NASA to pay for them?

Answer: The NASA request before the Congress represents a well thought out program with a balanced set of priorities. To fund the new starts at the expense of other NASA projects would be disruptive and not in consonance with effective planning.

Question: Let's turn to the issue of NASA's basic infrastructure. To make sound choices, we need to know what you consider the core programs that are necessary for a robust civil space program.

The National Academy of Sciences transition paper on space policy recommends that this core program contain two things.

First, an annual base program of about $10 billion a year, plus inflation. Second, special initiatives, agreed to by the President and the Congress, funded at a rate of $3-4 billion per project in the peak year of an initiative. Would you agree with this approach to developing space policy, and if you do, how does the FY 1990 budget reflect this philosophy?

Answer: The National Academy of Sciences paper is concerned with several aspects of the civil space program, including assurance of a strong, balanced program with both a stable base and provision for special major initiatives to enhance the base program. The Academy indicates that about $10 billion would be required for the base program including transportation, science and applications and technology. The Space Station would be a special initiative not included in the base, and since the report addresses space only, it is also apparent that the aeronautics program is not intended to be covered within the base amount. Although we believe that programs, including those in the base must be budgeted in terms of the specific annual funding requirements for the planned activity, there is a great deal of merit in the objective of providing a stable funding plan.

Actually NASA's FY 1990 budget plan of $13.3 billion is within the Academy recommendation. The Academy's $10 billion base program escalated to 1990 would be about $10.6 billion. The Aeronautics program including relevant civil service involvement and construction of facilities is $940 million, and the Space Station is slightly over $2 billion. This would be a total recommended program of $13.5 billion which is about $.2 billion more than the NASA FY 1990 request. The runout of the FY 1990 budget for FY 1991 is $14.6 billion and would be about $.6 billion less than the Academy recommendation which would be $11.2 billion for the base program, about $1 billion for Aeronautics and $3 billion for Space Station.

In summary, we believe that the objectives of the Academy report are constructive, but that funding requirements should be developed on a program by program basis with appropriate regard for overall program balance, schedules and content as well as total budget levels.

Question: The Academy transition paper considers the space station to be a special initiative, rather than part of NASA's core program. Under their rationale, that would mean you would not fund the station in FY 90, if it came at the expense of NASA programs like the shuttle, space science or basic aeronautics research. Is this a realistic approach to viewing the station debate in FY 1990 -- that we should not cannibalize the rest of NASA to pay for it?

Answer: The Space Station Freedom is the next step in the development of our national space infrastructure. As a cornerstone of this infrastructure, the Space Station complements capabilities and objectives across all parts of our space program and is not funded at the expense of the other space programs. The FY 1990 budget request to the Congress supports a vigorous space program which includes the development of a permanently manned space station. Space Station Freedom is a vital investment in America's future and cancelling or delaying it would be an unacceptable setback for the U.S. space program.

Space Station

Question: Let's turn to the Space Station program, where you are requesting $2.1 billion, an increase of $1.2 billion, or 125 percent, over last year.

One area where NASA has faced some criticism is in its failure to report the full project costs of the station.

In 1987, NASA said the station would cost $14 billion to build, but failed to say that it would need an additional $14 billion to launch and assemble it in space.

What is your current total cost estimate for development, launch and in-space assembly of the station in real-year dollars?

Answer: The 1987 estimate was identified at that time as the cost to design and develop the Space Station, expressed in constant 1987 dollars. It was noted at the time that the estimate excluded the cost of Space Shuttle flights, operations, tracking and data acquisition support, civil service salaries, and other related costs. When these costs are included and provision for inflation is incorporated, the total cost for the Space Station in real-year dollars is estimated at $30 billion, of which $24 billion is for development, launch, and assembly. This includes $20 billion for definition and development; $2 billion for space flight (transportation), control, and data communications; and $2 billion for the Flight Telerobotic Servicer, transition definition, orbital debris radar, construction of facilities, and research and program management. Space Station operations, operations planning, and related activities (roughly through 1997) will require an additional $6-7 billion.

Question: Does your figure include funds for a Crew Emergency Return Vehicle (CERV), and agency personnel and infrastructure costs, like use of the shuttle -- which will be used to support the Station's development and assembly?

What would these other items add to the total cost of the station. For example, they project only $50 million for each of 20 shuttle flights, rather than the $300 million it actually costs to launch a shuttle.

Answer: The amounts provided in response to the total cost for the space station (previous question) did include agency personnel, infrastructure costs, an ELV for the Polar Platform, and the marginal costs for the Space Station use of the Shuttle as well as of space and ground network, communications and data systems. The average cost of Shuttle missions was not used because we believe the marginal cost approach best represents the budgeting impact to the Shuttle program of meeting Space Station requirements. The CERV was not included since a decision on how best to meet crew rescue requirements has not been made. If the CERV option is selected, NASA will request funding for development and will amend its cost estimates accordingly.

Question: Once the station is assembled and operating, what would be its annual operating costs?

Answer: The annual mature operations costs in FY 1990 dollars are anticipated at $1.6 billion.

Question: How early would the station operating program reach $1.4 billion, as soon as the station has man-tended capability in late 1995, or not until it has permanently manned capability in late 1996?

Answer: The operations program is currently being assessed. Previous estimates of annual operations costs were a little over $1 billion for 1995, and approached $1.4 billion for 1996-1997. Mature (steady state) operations will probably not level off until several years after assembly is complete, depending on the time needed for lay-in of initial spares.

Question: The most significant change in the final version of your life-cycle cost directive is that it delegates the five points of this process to individual NASA centers.

How do you intend the Space Station's Reston Project office to maintain control over this process if it's left to the Centers? If so, this makes the content of these computers models very important. Are these particular models finalized and incorporated into the Space Station's baseline configuration?

Answer: The program office controls the overall design-to-life-cycle cost (DTLCC) process by setting to-level requirements for its use. Each center responds by developing the implementation plans, methodology, and tools that are best suited for its segment of the program. The program office will review these measures for compliance with program objectives and will enforce their use. The program office will also perform independent assessments of analyses supporting major design decisions.

The System Design Tradeoff Mode (SDTM), a computer model for analyzing life-cycle performance and cost impacts, has been finalized and is maintained under configuration control.

Question: NASA's Aerospace Safety Advisory Panel recently criticized the Space Station's management structure.

For example, it said that the five centers involved in the station program were more experienced and technically competent than the Reston Program Office which is designated to guide and oversee the individual centers activities.

This speculation, combined with Mr. Odom's sudden departure, may lead to speculation that the Station program is adrift and in a state of chaos.

Are the panel's comments about the quality of your Reston operations accurate, and if so what steps are you taking to correct it?

Answer: Many of the concerns raised in the ASAP report result from difficulties we have had in adequately staffing the Reston Program Office some of which have been due to the unavailability of R&PM funds. However, the President has recently signed the FY 1989 Urgent Supplemental giving NASA the authority to transfer funding into R&PM enabling the program to increase its civil service staff and provide for other institutional requirements. This action will hopefully alleviate some of the staffing difficulties at Reston. NASA has also taken other steps that mitigate concerns raised in the ASAP report. A recent reorganization has strengthened the systems engineering and integration function, which has been given priority in hiring, and is roughly 40 percent of the total personnel strength at the Reston Office. In addition, the role of the Space Station Engineering and Integration Contractor has been revised to make more effective use of its technical capabilities.

Shuttle Program Flight Rate

Question: You are requesting just over $3 billion for space transportation this year, a $519 million increase over last year, with about $120 million of that growth to purchase expendable launch vehicle services.

I have seen some reports that this year's shuttle flight manifest may change because of delays in processing the orbiter Columbia in time for the Galileo launch.

This would result in delaying an upcoming DOD payload launch, as well as that of the Hubble Telescope, currently scheduled to go in December.

a. What is the status of the flight schedule for the rest of this year?

b. Will some sort of delay have a significant budgetary impact on NASA?

c. How will it affect the launch date for the Hubble Telescope?

Answer: Four flights are scheduled for launch in the remainder of 1989:

STS-28	Columbia	DOD Payload	July
STS-34	Atlantis	Galileo	October
STS-33	Discovery	DOD Payload	November
STS-32	Columbia	LDEF Retrieval	December

b&c. If problems arise that cause the schedule to slip, the budgetary impact varies according to the length of the delay and the nature of the problem that caused it. In addition to Shuttle impacts, a launch delay means maintaining the payload support team for a longer period and impacts the payload budget accordingly. For example, if the Galileo mission had to be slipped to the next planetary window, a major budget impact would occur. In our June manifest, the largest single impact was to the Hubble Space Telescope which slipped from December 1989 to March 1990.

Question: You are requesting $25 million for continued work on the extended duration orbiter (EDO) that will enable shuttle flight crews to stay in space 16 days, with the possibility eventually of a 28-day orbiter.

The budget request assumes there will be some private financing for this program next year.

Is that a realistic expectation, and if not, what is the amount you would need to keep the EDO on schedule for its first scheduled 16-day mission in early 1992?

Answer: Prospects for obtaining private financing are being worked at this time. Rockwell International (RI) has expressed interest in supporting private financing for the EDO 16-day capability, and Teledyne Brown Corporation presented NASA an informal proposal to provide RI with the required private financing support. Subsequent NASA analysis indicated that the Teledyne arrangement could be in the governments best interest, but a formal proposal is required to perform a specific analysis. We are very hopeful that suitable arrangements can be made.

Question: Your justification says that you will do initial work on a 28-day orbiter next year.

As I recall when I visited the Kennedy Space Center earlier this year, there was some concern about whether or not shuttle pilots could negotiate landings after staying in orbit for that length of time.

a. What kind of life science work are you doing to determine what the maximum safe EDO capability is and how soon do you think you'll be able to make a judgment about the 28-day orbiter?

b. (Follow-up: what are the costs you project to meet this 28-day EDO schedule?)

Answer: The current Life Sciences Division EDO Medical Program will provide, by 1992, the research necessary to develop training devices and procedures such as exercise protocols, for EDO flights of up to 16 days. These activities will ensure that crewmembers are physically capable of piloting and landing the orbiter and performing emergency egress actions if required.

Additional Life Sciences activity necessary for EDO flights of up to 28 days will depend on the results of the 16-day EDO project. Enhanced protocols may be necessary to ensure adequate cardiovascular and muscle function for 28-day flights.

Shuttle crews are extensively trained in piloting and landing skills, and this training continues up to the launch of each mission. It is not currently known if pilots can maintain adequate skill levels during 28-day flights; onboard simulators may be required to maintain proficiency. Additionally, 28-day flights will exacerbate concerns about adaptability. Environmental contamination of the spacecraft atmosphere and water supply will have to be carefully monitored in real time. (Currently, samples are returned to Earth for analysis.) The waste management system will also have to be upgraded to accommodate EDO missions of 28 days.

Work is underway at this moment to define the content and costs associated with 28-day EDO capability. Experts at JSC, KSC and RI are preparing a 28-day EDO plan for presentation in July. Information on costs for accomplishing 28-day EDO capability will be available at that time.

Question: You are requesting only 15.2 million for structural spares for the shuttle next year, a cut of $5.1 million over the actual 1989 level and $32 million less than what you requested for 1989.

Why has your policy changed on where this ranks in priorities in the budget?

Answer: Current requirements to support the near term STS flights have taken a higher priority for use of these funds. NASA still considers the structural spares program important to the future of the STS system and therefore, is searching for alternative sources of funds to permit a full start of the spares late this fiscal year.

Question: Is it possible for you to prioritize for the Subcommittee the $50 million in structural spares which OMB took out of your budget so that any savings on the 5th orbiter's construction could potentially be applied in a targeted way for purchasing these spares?

Answer: The agency has not established, at present, priorities concerning the use of any potential savings on the construction of OV-105. We are, however, in the process of assessing the program requirements and alternative implementation schedules for structural spares.

Shuttle-C

Question: I noted recently a considerable amount of media coverage for the rollout of a full-scale model of the Shuttle-C, the unmanned version of shuttle which is proposed as a new start in FY 1991. During our visit to the Marshall Space Flight Center in February, Congressman Traxler and I both expressed considerable skepticism about finding the $1.9 billion in funds necessary for a new program like this. Are any funds in the FY 1990 budget for the Shuttle-C?

Answer: The current study efforts are being conducted with $10 million of FY 1988 funds. No funding was requested in the

FY 1990 budget for Shuttle-C. If over the next few months the Administration were to make the decision to move forward with a FY 1991 new start, there will be a requirement for some level of funding in FY 1990 to expand the contractor and in-house Phase B activities.

Question: I'm told that the Shuttle-C team at Marshall intends to request a reprogramming of up to $50 million for this program in FY 90. Is that true -- why would it be necessary if it's not proposed as a new start until FY 1991 -- and where would you get the $50 million from?

Answer: The $50 million figure was an early Marshall planning number to support pre-Phase C/D activities for a FY 1991 new start and first flight in late 1994. No decision has been made on this proposal pending a review of the entire Shuttle-C phasing as part of the FY 1991 budget process.

Question: Except for the Space Station, what other programs would require 150,000 pound lift capability provided by the Shuttle-C? Why couldn't these requirements be met with the use of expendable launch vehicles like a Titan IV?

Answer: The 100-150 thousand pound lift capability to low Earth orbit provided by Shuttle-C could be used to significantly enhance other missions, such as:

-- High energy planetary missions could be accomplished with a significant reduction in transit times (and thus cost and mission risk) -- i.e., the Cassini mission to Titan would require only four years using Shuttle-C with high energy upper stage versus over six years using a Titan IV/ Centaur and a Jupiter gravity assist trajectory;

-- Larger and more capable spacecraft could be placed in Earth orbit;

-- Polar and Sun synchronous orbits with substantial payloads would be possible from the Eastern Test Range (thereby providing an alternative to the Western Test Range); and;

-- Retrograde (westerly) orbits from WTR would be possible, thereby enabling a new class of Earth viewing missions.

The Titan IV, with less than 50 thousand pounds lift capability to low Earth orbit, is not capable of supporting potential uses of Shuttle-C capability.

Question: Does starting the Shuttle-C enjoy higher priority within the agency than completing work on the Advanced Solid Rocket Motor? How does it rank next to the Orbital Maneuvering Vehicle?

Answer: Both the Advanced Solid Rocket Motor (ASRM) and the Orbital Maneuvering Vehicle (OMV) are approved programs and as such do not compete with Shuttle-C. As approved programs, both the ASRM and OMV have higher priority than the Shuttle-C as Shuttle-C activities are in the definition study stage.

National Aero-Space Plane

Question: You are requesting $127 million for the National Aero-Space Plane, an 83 percent increase over 1989.

As I understand it, DOD has proposed cutting their portion of the program in 1990 by half, from $300 million to $150 million, and in turn transferring the entire project to NASA.

Has there been an agreement between NASA and DOD to undertake this transfer?

Answer: As a result of the proposed action of the DOD, the NASP program has been reviewed by the National Space Council, headed by the Vice President. This review includes the funding and management of the program. The Space Council has reviewed the NASP program and recommended to the President that the NASP program be stretched approximately 2 1/2 years and the funding recommended is as follows:

	FY 1990	FY 1991	FY 1992
	(dollars in millions)		
NASA	$127	$119	$72
DOD	$127	$158	$233
	$254	$277	$305

The Space Council concluded that a slower pace would be prudent in light of the budget constraints and risk assessment. The President approved the Space Council recommendation.

Question: Your latest project status report on this program indicated that the total NASP program costs had jumped from just over $3.3 billion to nearly $3.8 billion, with NASA's share having gone up from $665 million to $767 million.

First, what accounts for this change in estimate -- and second, if DOD does transfer this program to you, where do you intend to get the extra $3 billion or so to take charge of this program?

Answer: Firstly, the increase from $3.3 billion to $3.8 billion was caused by the total program being extended 2 1/2 years. NASA has agreed to fund 20 percent of the total program cost, thus NASA's share of the increased program costs due to the 2 1/2 year extension is $102 million.

Secondly, the program has been reviewed by the Space Council. And as stated above, DOD/NASA will retain an appropriate joint management and funding structure.

Privatization/Commercialization Initiatives

Question: NASA's original budget request contained seven different proposals for commercialization in FY 1990.

In allowing you to award the contract on the Flight Telerobotic Servicer, OMB backed off on requiring private sector financing on the first of these seven proposals.

By asking the private sector to pick up the tab on these six other projects, as I understand it, OMB hoped to save you over $200 million in costs in FY 1990.

Is there any real interest in the private sector to move forward on any of these proposals?

Answer: Yes, there is a real interest in a number of the proposed projects. As a specific example, the Advanced Solid Rocket Motor formal contractor selection was recently completed with Lockheed Missile Systems Division being selected to enter into formal negotiations. NASA will negotiate with Lockheed on the basis of privately financed construction of the production and test facilities. As stated in the hearings, NASA will need to be granted legal authority to assume liability in excess of available appropriations to support award of the contract.

The draft Requests for Proposals for the Neutral Buoyancy Laboratory at the Johnson Space Center and the Space Station Processing Facility at the Kennedy Space Center have been provided to interested prospective contractors for comment. Based on the responses to the draft RFPs, we expect to reach a decision on the feasibility of proceeding to a formal RFP stage in the July timeframe.

The revised commercialization approach for the FTS is to reserve the intellectual property rights to offer to the U.S. private sector along with right of access to tooling and production equipment and appropriate technical support for future applications. To date, NASA has received over 45 expressions of interest from the private sector.

The potential for private investment in the Extended Duration Orbiter is under active discussion with the prime contractor, Rockwell International with a serious interest currently being indicated.

Question: Under what conditions would it be cost effective for the Congress to allow NASA to go forward with any of these privatization proposals?

Answer: In those instances where the private sector is willing to put its own capital at risk and share the use of the facility or use it for multiple purposes over time, we believe the cost analyses will show an economic advantage to the Government. There also may be specific instances where shared use is not feasible and other factors affecting program development and operations will have to be carefully evaluated before proceeding with formal procurement actions.

Question: Am I correct in understanding that privatization would cost the Government an additional $150 million if NASA were to end up as the sole user of the facilities built?

Answer: We do not anticipate that NASA will be the sole user. However, based on the preliminary summary analyses in January 1989 and associated economic factors at that time, the statement is correct. However, in accordance to OMB circulars, each specific proposal will be reviewed for its benefits to the government as well as other factors.

Question: Is NASA and the Administration prepared to go forward with these projects if they cost the Government money?

Answer: NASA will closely examine the independently analyze each proposal received from industry to determine the economic benefits, the mission suitability and programmatic benefits, and the overall reasonableness before recommending whether or not to proceed. As we have stated in the hearings, if acceptable and timely proposals for private investment are not feasible and obtainable, alternative funding approaches will be required.

Question: Nevertheless, if the seven NASA third party financing proposals are exceptions and could end up costing the Government money, how were the particular exceptions justified in the discussions between OMB and NASA?

Answer: In discussions with OMB, it was recognized by OMB and NASA that the unique circumstances of the Jet Propulsion Laboratory being operated by California Institute of Technology by contract to NASA, could preclude the Observational Instruments Laboratory being amenable to shared use with private industry. Therefore, we are considering a separate proposal by Cal Tech in which the programmatic and operating benefits may well outweigh the modest additional cost to the Government.

The possible advantages and disadvantages of proceeding with the other projects, should they incur additional costs to the Government, have not been discussed with OMB at this stage. However, it is clearly recognized that no single approach for privatizing these diverse projects will work in every instance, and that each proposal will be analyzed on its own merits. We do not underestimate the difficulty of measuring each project's potential for fostering private investments and reducing Government costs in the long-term. We will need some reasonable degree of flexibility to effectively consider innovative approaches by the private sector.

However, the ASRM proposal for private sector financing has been reviewed by OMB, in compliance with Circular A-104 and OMB supports the private financing proposal for the ASRM facility.

Future Missions/Technology Initiatives

Question: Dr. Fletcher, in light of the FY 1989 reductions to the Pathfinder Program and the substantially reduced FY 1990 budget request for this program, is 1992 still the timeframe for a major policy decision on a future NASA mission?

Answer: At the present time, various alternate strategies are being considered for decisions on, and implementation of, future exploration missions. Pathfinder is not directed toward any single mission option, but provides a broad technology foundation for an array of future potential piloted and robotic solar system exploration missions. The research and technology results from Pathfinder will provide substantially improved design data, reduced risks and costs that will support future decisions on potential major initiatives.

The funding levels in FY 1989 and FY 1990, which are lower than our original plans, will result in program reductions in scope and substantial delays in program deliverables, including engineering and technology data to support informed national exploration mission initiative decisions. Current budget levels will not provide originally planned levels of technology data or readiness for the broad array of potential missions supported by Pathfinder until the late 1990s timeframe.

Question: If this Committee supported such a decision in 1992, what levels of funding would be required for the Civil Space Technology Initiative, the Pathfinder Program, the In-Space Flight Technology program and the core NASA technology program?

Answer: The Space R&T program consists of three ongoing programs, the R&T Base, the Civil Space Technology Initiative, and the Pathfinder program, and one FY 1990 new initiative, the In-Space Technology Experiments program. The overall Space R&T program represents an appropriate balance of focused and fundamental research, of ground and flight research and of applied and basic research. All elements of the program contribute to the revitalization of the Nation's civil space capabilities and will enable potential future civil space missions.

The Pathfinder program is specifically designed to provide the key technical and engineering data essential to a well-informed decision on any potential future solar system exploration mission.

At the current proposed budget levels, Pathfinder could support an informed decision on a future solar system exploration mission sometime during the 1990s. However, the key thing to remember is that the availability of information and the level of technology readiness must be the guiding lights for decisions on specific missions and timetables. Artificial or arbitrary decision dates, not supported by technology readiness, invite risk, cost growth and delays.

The core Research and Technology Base program is the ongoing fundamental research foundation upon which future civil space capabilities are built. This program includes ongoing, long-term basic research in areas such as advanced materials, information systems, and advanced propulsion and power concepts.

The Civil Space Technology Initiative is an ongoing focused program designed to provide technology in support of transportation to, operations in and science activities in near Earth orbit. This program was initiated in FY 1988 to fill widely recognized gaps in the research and technology base and was the first step in an overall revitalization of the Nation's civil space capabilities.

The In-Space Technology Experiments program is proposed as an FY 1990 initiative that will develop and validate key technologies required to operate in space which cannot be tested on the ground. It is designed to extend the Nation's space research and technology efforts beyond the limitations of ground-based laboratories and utilize more fully the current space infrastructure, such as the Space Shuttle and ELVs, as well as lay the groundwork for Space Station Freedom utilization in the 1990s.

U.S. Space Activities Versus Other Countries

Question: In the three years since the Challenger tragedy, we've heard a great deal that the Soviet Union is the world leader in space. Do you agree with that assessment? Is their leadership only in selected areas or across the board?

Answer: Assessments of "who is ahead in space" are very subjective. The U.S. and Soviet space programs have developed in accordance with the particular needs of each nation.

The Soviets undeniably have a strong program; it is especially strong in selected areas: long-duration manned space flight, space stations, and launch vehicles. On the other hand, the U.S. has done well by almost every measure of space leadership.

In a demonstration of Soviet capabilities in terms of long-duration manned space flight and space stations, two cosmonauts recently completed a year-long mission on the latest space station, Mir. The U.S. cannot begin to close this gap in capabilities until the Space Station is launched in the 1990's.

Last year, the Soviets enjoyed another success with the (unmanned) launch of Buran, their shuttle, on the Energia launch vehicle. On the other hand, the U.S. Space Shuttle has completed twenty-nine flights, each one manned, since the first flight in 1981. The U.S. Shuttle will conduct six missions in 1989. Buran will not fly at all in 1989, according to recent Soviet statements. Fifty-nine U.S. Shuttle missions are scheduled through the end of 1994.

The U.S. space science program includes achievements and planned projects unparalleled in the Soviet program. In the past, the U.S. has explored virtually the entire solar system. In particular, the unique Pioneer and Voyager missions to the outer planets have no counterparts in the Soviet program. The Soviets concentrated on Venus and Halley's Comet. In the future, while the Soviets have ambitious plans, their proposed Mars program also represents a limited agenda and is not yet approved. NASA has approved missions to Mars, Venus, Jupiter and the sun, and planned missions to a comet and asteroids, Saturn, and eventually the moon. In astrophysics, the U.S. has a number of approved missions, most notably the unparalleled "Great Observatories": the Hubble Space Telescope (1990 launch); the Gamma Ray Observatory (1990); and the Advanced X-Ray Astrophysics Facility (1996). All represent major milestones in space science. The Soviet program will apparently emphasize a single approved ambitious astrophysics mission, Spectrum-X.

In Earth sciences, in the 1990s, the planned Earth Observing System (Eos) will study global change using some of the most sophisticated observational instruments ever developed; it will provide long-term data sets for Earth system science, including the evolution and interaction of the various components. The Soviets have developed a third-generation meteorological satellite and are marketing remote sensing images with higher resolution than that commercially available in the West; on the other hand, their lack of long-term data and global models hinders their scientific efforts in terms of Earth sciences.

It is worthwhile to note that while the question of "who's ahead in space" may be inevitable, it may be increasingly irrelevant. We are now seeing a more multipolar world in terms of space activities, with vigorous programs being undertaken by the European Space Agency, France, Japan and others.

Question: The U.S. space science community, in particular, has raised warning flags that the Soviets are taking over the lead in planetary exploration.

Others argue that the Soviets have lots of proposals, as do we, but no approved programs, while we have three (Magellan, Galileo and Mars Observer).

What is your opinion of the relative positions of the two countries in planetary exploration, especially in light of the recent failure of their Phobos probes to Mars?

Answer: The two nations' planetary exploration programs must be examined both in terms of past achievements and plans. The Soviet program has specialized in the inner planets. From the 1960's through the early 1980's, the Soviets concentrated on Venus. They currently have an ambitious program focusing on Mars, though none of the planned missions has yet been officially approved. The program would send orbiters in 1994 and perhaps rovers in 1996, to be followed by a sample return mission in 1998. The program has been shadowed by the unfortunate loss of the two Phobos spacecraft, but it is premature to say that it has been slowed.

The U.S. has enjoyed a particularly strong and successful solar system exploration program. By the end of the decade, the U.S. will have visited every planet in the solar system, except distant Pluto. No other space program has (or plans to) come close to emulating the Pioneer and Voyager missions to the outer planets. The last Voyager planetary encounter, Neptune, is scheduled for August 1989. To follow up on these missions, NASA plans to place an orbiter around most of the accessible bodies in the solar system. Galileo, to be launched later this year, will study Jupiter's turbulent atmosphere and its moons. In 1992, the U.S., the acknowledged leader in Mars exploration, will send Mars Observer to do a detailed survey of the planet's surface chemistry and its atmosphere. The Magellan mission, which was launched in

May, 1989, will for the first time map the entire surface of Venus. Ulysses, which is to be launched in 1990, will study the sun. Proposed missions would study comets and asteroids (CRAF) and Saturn (Cassini).

In a sense the U.S. and Soviet planetary programs currently complement each other rather than compete: the U.S. will provide information on a broad range of planetary objects; the Soviets will provide detailed information on Mars.

As noted above, it is premature to say whether or not the loss of the Phobos probes will slow the pace of Soviet solar system exploration. Space exploration is a high-risk business. Nations are undertaking increasingly difficult and complex missions in space; all face the possibility of the failure of a spacecraft or instrument.

Question: Have the Soviets been forthcoming through the joint working group or other channels about the causes of the failures on Phobos 1 and 2? Have the failures undermined your confidence in Soviet technical capabilities, that is, are you less enthusiastic today about cooperating with them on future Mars projects?

Answer: During a series of meetings with NASA officials in Moscow after the failure of Phobos 2, the Soviets were open with what information they had regarding the failure of the spacecraft.

It should be noted that despite the failure of Phobos 1 in October 1988 and the failure of Phobos 2 in March 1989, much valuable data was acquired by the two spacecraft. U.S. scientists will receive this data under cooperative arrangements in place with the Soviets.

It is premature to discuss what implications the failure of the Phobos mission may have on prospects for U.S.-Soviet space cooperation. Space activity is a risky undertaking, and failures do occur. The failure of the Phobos mission does not in itself justify general conclusions about Soviet space capability, and the U.S. should not base decisions on whether or not to cooperate with the Soviets on this single event.

Question: I know that DOD often argues that the Soviets are "ahead" in launch capability because they launch so many times a year, which gives them a "surge capability" to launch frequently in times of crisis.

How do you in NASA feel about this? In terms of getting the job done in space, is it an advantage or a disadvantage to launch so many times a year because satellites have short lifetimes?

If it's an advantage, should the United States adopt the same approach and build just Explorer-class satellites instead of space observatories like AXAF, for example?

Answer: The USSR clearly does launch many more times per year than the U.S. As is the case with other aspects of each nation's space program, this difference reflects varying approaches to problems and objectives.

In the Soviet case, a combination of readily available production-line launch vehicles with varying capabilities, and an approach focusing on short-lived spacecraft, results in a high launch rate. Having both spacecraft and vehicles available for quick launch gives the Soviets a surge capability.

While NASA lacks a similar capacity, it does have the capability to build spacecraft geared to the scientific objectives of projects requiring long lifetime spacecraft. The extremely successful Voyager missions to the outer planets, for example, would not have been possible without this technology. The Explorer-class satellites are not designed as short-lived satellites. The advantage of the Explorer line is the established construction infrastructure which can be used for multiple missions.

Clearly, flexibility in terms of the types and frequency of launches is important. For that reason, NASA is restoring a mixed fleet made up of Shuttles and commercially-provided expendable launch vehicles.

Question: The Soviets are talking more about the possibility of building a lunar base in the early 2000s, but I haven't heard much about doing that mission cooperatively. What are the chances for superpower cooperation there?

b. Many people talk about doing the Mars mission with the Soviets. Do you think a bilateral program, just involving the superpowers, would be successful or would it be subject to political upheavals?

c. Have there been any discussions with other countries, like France or Japan, about a broader international effort in putting bases on the Moon or travelling to Mars? Would the involvement of more countries help or hinder these types of mission?

Answer: The U.S. is currently studying whether the next goal of U.S. space exploration should be the Moon or Mars. Clearly, the range of options and approaches should not be dictated by the priorities of other space programs. After U.S. goals have been determined, the U.S. will be able to consider whether pursuing them through cooperative missions with other nations, including the USSR, is desirable and technically feasible.

In the meantime, ongoing and planned cooperative activities with the USSR will put us in a position to assess Soviet interests and capabilities and will provide an experience base in working with the Soviets. For example, under the 1988 amendment to the 1987 US-USSR civil space agreement, the two sides are beginning to fly scientific instruments on each other's spacecraft, and to exchange the results of independent national studies of future unmanned exploration missions, including missions to the moon and Mars.

b. It is impossible to predict if a bilateral program involving Mars would be successful or not. Certainly it would be subject to political upheavals. The U.S. probably would not undertake such a program to the exclusion of our traditional partners in space, and without acquiring substantially more experience in working with the Soviets than we now have. Aside from the significant U.S. budget commitment involved, our interest in proceeding with a jointly planned, developed and implemented Mars mission would depend on the capabilities the Soviets could contribute and on whether the mission could be structured so as to protect U.S. technology and enable the U.S. to continue independently if the political climate worsened.

c. NASA initiated discussions with its friends and allies concerning potential cooperation in the future on human solar system exploration missions over one year ago. NASA is exchanging information on respective plans and interests of potential partners. There are scientific and technical, economic and political benefits to be gained from such cooperation. However, these must be weighed against other national interests. It is premature at this stage to specify the nature or partners for cooperation on human solar system exploration programs, however, given NASA's long history of successful international cooperation, the agency is confident that a mutually agreeable and effective cooperation can be developed in this area in the future.

Question: Apart from the Soviet Union, where do you see the most competition in space coming from during the 1990's? Will Europe continue to be our major economic competitor in space in terms of launching satellites? What about China and the Soviet Union?

Answer: NASA is no longer a supplier of commercial launch services. However, we would conclude that the Chinese Long March series of expendable launch vehicles (ELVs) are competitive for certain uses. The trade agreement concluded with the PRC as a precondition to the U.S. licensing three U.S. satellites to be launched on Long March was designed to assure that the Chinese will abide by fair trade practices. The agreement also limits the market share available to the Chinese. Under the agreement, there will be frequent consultations and continuous monitoring to ensure that the terms of the agreement are kept.

The Soviets are also seeking to market their ELVs, especially Proton. However, it is the policy of the U.S. Government that U.S. satellites may not be launched on Soviet launch vehicles. Europe is indeed the likely major economic competitor in terms of launch capabilities. During the 1990's Europe will gain increasing technological capabilities, in particular with its development of the Hermes space plane. Autonomy in space remains a key European goal. However, the Japanese should not be left out of the equation. They too have ambitious plans for the future, including plans to develop the H-2 launch vehicle entirely with indigenous technology. While they are not quite as far along as Europe, they are increasing capabilities at a rapid rate, and have strong government support to continue in this direction.

Question: How much an economic threat do you think Japan will pose in terms of launch capability, or in other areas, such as communications satellite technology? Is the ACTS program still essential to maintaining U.S. competitiveness with Japan in communications satellite technology?

Answer: Given the opportunity to use their launch site only twice each year, Japan will not pose an immediate threat in the launch market. In the area of communication satellites, the Japanese are using their own electronics expertise and licensed U.S. technology. Their satellite technology is less advanced than either the U.S. or European technology. So far, the foreign threat is in the technological capabilities; to date no foreign producers have attained the production levels and manufacturing efficiencies necessary to compete with U.S. companies for lead in the space-based segment, Japan has been extremely successful in capturing the majority of the market for ground-based communications equipment.

The U.S. Advanced Communications Technology Satellite (ACTS) is essential to maintaining U.S. competitiveness with Japan in communications satellite technology. Japan is currently developing the next generation of Engineering Technology Satellites (STS-VI), scheduled for launch in 1992, the same timeframe planned for ACTS, and incorporating similar technologies. ACTS includes sophisticated on-board baseband processing and switching, as well as electronically hopping spot beams, technologies which will enable the next generation of satellites to meet the requirements for enhanced network flexibility and efficiency, and will assure the United States' competitive position in space-based communications satellite systems.

Question: How are plans coming for the 1992 International Space Year? As you know, I'm an original cosponsor of S.J. Res. 75 calling for President Bush to endorse ISY, as did President Reagan. My distinguished colleague, Senator Matsunaga, who is sponsoring the legislation, has expressed concern that ISY has become too focused on Mission to Planet Earth.

a. What is NASA doing to ensure that ISY is a broadly based activity, including human activities in space, space astronomy and planetary exploration, and education, for example?

b. What is NASA doing to ensure that developing countries will have a role in ISY other than providing ground truth data for Mission to Planet Earth studies?

c. Has SAFISY, the Space Agencies Forum for ISY, which was initiated by NASA and has become the de facto organizing unit for ISY, initiated efforts to bring countries that don't have space agencies into ISY?

Answer: While NASA has focused primarily on activities related to Mission to Planet Earth as the initial area for ISY, as has been endorsed by the members of the Space Agency Forum for ISY, we do not intend it to be an exclusive theme. We are also working on a number of initiatives in the area of education, and space sciences activities which are under discussion. Now that the ISY activities in Earth sciences are fairly well defined, we anticipate expanding the areas of SAFISY coordination.

b. With regard to the role of developing countries, we have encouraged their active participation in SAFISY. It is NASA's hope that this participation will spark an interest in other contributions. In addition, developing countries are a key focus of the planning for ISY education activities.

c. While SAFISY, as the name implies, is intended to be the coordinating body for space agencies, we have encouraged the participation of such groups as the International Council of Scientific Unions, which represents national academies around the world, in SAFISY. Through liaison with such non-space agencies, SAFISY is broadening the scope of the activities beyond the traditional space agencies.

Strategic Planning

Question: A 1988 GAO report found that while NASA's centers engage in this kind of planning, only one of its headquarters program offices, space science, had completed a similar kind of plan.

What is the status of strategic planning in NASA's program offices and when do you expect them to have completed their initial plans?

Answer: In its strategic planning, NASA has adhered firmly to two basic principles of planning. The first, that planning in each individual organization must be tailored to the characteristics of that organization must be tailored to the characteristics of the organization, has guided us not to impose one form of planning on all our program offices. Thus, because the activities of the different program offices vary significantly, the form of their planning and the resulting products also vary. The second principle is that the real value of planning is in the planning itself and the decision that result therefrom, not in a document. A published plan is a snapshot that likely becomes slightly out of focus during the time required to print it. In spite of their temporality, strategic documents have been published or are in preparation in each of the program offices.

Two of the six program offices have published their strategic plans. The Office of Space Science and Applications had published its initial plan by the time of the hearings, and has since, in April 989, published a revised version of the plan. The Office of Exploration's work is, by its very nature, all strategic planning. The first report relating to its planning was the Ride report, Leadership and America's Future in Space, published in August 1987. That report was superseded in November 1988 by the Office of Exploration's Annual Report Beyond Earth's Boundary.

The Status of the strategic planning of the other program offices is as follows:

Office of Space Operations - The text of its planning document is complete and layout design is in process. Publication will follow as soon as the layout design is approved.

Office of Space Flight - A strategic planning document is in process, but has been slowed by organizational and personnel changes. Publication is expected by late summer 1989.

Office of Space Station - Preparation of strategic planning documents is in process, with publication of a strategic planning process document expected by September 15, 1989, and of a strategic plan by October 30, 1989.

Office of Aeronautics and Space Technology - The basis for the Office of Aeronautics and Space Technology's aeronautics strategy is contained in the OSTP document "National Aeronautics R&D Goals", "Technology for America's Future" (1985), and "Agenda for Tomorrow" (1987), augmented by the "Civil Aeronautics Technology Development and Validation Plan" submitted to Congress in March 1988. Tying these documents together and updating them to focus on current high-priority needs will be accomplished during 1989. In a similar manner and during the same period, the strategy of the space R&T program will be updated based on CSTI, Pathfinder, in-space experiments, and increased emphasis on university programs.

The documents described above only reflect a small portion of a program office's planning activities. Each program office has detailed program plans for its programs. Each office also has a methodology by which programs and overall direction are established. In other words, strategic planning takes place within each office on a continuing basis, whether or not a document called a strategic plan has been published.

Question: How will NASA's agency-wide strategic plan prioritize the competing needs of the program offices so that the agency's overall goals drive individual projects and not the other way around?

Answer: A principal outcome of NASA's strategic planning is the development of integrated goals that provide the direction and framework for agency programs and the requisite supporting infrastructure, institution, and technology. Current agency goals are set out in "Agenda for Tomorrow."

A strategic planning cycle initiated in August 1988 will refine or modify those goals, as appropriate. Special attention will be given to examining the totality of NASA's program elements in response to the goals and the capability of the agency to support each program element. Decision criteria will be developed to provide a basis for selecting among programs that compete for resources.

A strategic plan is by its nature long-range. A strategic plan is a snapshot that guides the decision-making process, but does not set out all program details for the foreseeable future. Factors such as technical considerations, national priorities, and budget and resource constraints prevent the development of a highly specific plan. Instead, a strategic plan should identify direction and establish criteria by which individual program decisions are made to further the agency toward its identified direction. As a result, NASA's strategic plan will identify direction (its goals), the programs underway in support of that direction, future program areas that will further progress, and as methodology for making decisions at the appropriate time.

Space Station & Life-Cycle Cost Management

Question: In 1985, NASA told the House Science Committee it would control space station costs by using a design-to-life-cycle approach. GAO's report in March of last year said that life-cycle-cost management would be in place by mid-1988. The Space Station project director didn't sign a directive implementing this management process, however, until March 28, 1989.

Why did it take nearly a year longer to begin implementing life cycle cost analysis in the station program?

Answer: Life cycle cost analysis has been an important part of the Space Station Freedom program since its beginning. The decision to use a closed-loop life support system to save operations costs despite higher up-front costs is one example of the program's early commitment to lowering life-cycle costs. The life-cycle cost directive establishes a more formal process for considering life-cycle cost factors in design decisions. It should be noted that effective implementation of the design-to-life-cycle-cost approach requires sufficient flexibility to spend more in certain key area of the program early in the development process to greatly reduce future costs. The more constrained the near-term budget, the more difficult it is to reduce total program life-cycle costs.

Question: How long will it take NASA's centers working on the station to actually implement life cycle cost management?

Answer: Life-cycle cost analysis has been a part of the design process at the centers since the program began. The NASA centers will submit formal implementation plans as required by the recent life-cycle cost directive to Level II by early fall 1989.

Question: Will you review the current design of the space station so that life-cycle cost management is built into your current baseline of the station? Follow-up: If not, why not--what is the point of using this approach if it is not the starting point for design of the system?

Answer: While life-cycle cost has always been a factor in station design, the formal design-to-life-cycle-cost process being put into place now will assure that life-cycle cost impacts are more consistently considered in design decisions and that life-cycle cost savings are an award fee criteria for space station contracts. The program will also continue to identify potential design changes that could reduce life-cycle costs.

Question: Will you be using life cycle management before you start Preliminary Design Review on the station in August, 1990?

Answer: Yes. The directive formalizing the design-to-life-cycle cost process has taken effect and implementation plans are being drafted by the Program Office in Reston and the NASA centers. These plans will go into effect on approval by the Program Director.

Space Science Budget Overview

Question: Now I would like to focus on the space science budget. NASA's last two Administrators have each pledged that space science would receive at least 20 percent of NASA's annual budget. Last year your science request dropped to 19.5 percent and this year it is down to 18.5 percent? Why in a time when NASA's budget requests are growing by such a large amount have you failed to keep your pledge on the size of the space science budget?

Answer: NASA is fully committed to a general guideline of Science and Application at about the 20 percent level. Over the past decade NASA has funded space science and applications at approximately 20 percent and although the FY 1990 level is slightly over 18 percent given the current fiscal environment, the FY 1990 budget is appropriate. Fixed percentages are not the goal, a productive and balanced program which meets carefully laid out and agreed to objectives in a timely manner is expected to require those approximate levels of funding.

Each program and project has a funding profile that attempts to meet those goals in the most effective manner and that will require differing amounts in any one year. Balancing the programs requires careful review of the status of each project and judgments concerning its progress and contributions toward the goals and objectives of the Science and Applications programs.

Question: Does this suggest that space science holds a position of less priority within the agency than the manned programs?

Answer: No. NASA fully supports an appropriate balance between manned and unmanned activities and, as a whole, the FY 1990 budget request for Space Science and Applications supports a vigorous and balanced program. The Space Science and Application request will continue the critical support needed to carry out the ongoing program, prepare us for an orderly transition to the Space Station, and establish the strong planning base needed for the program of the future. We believe that the FY 1990 budget request is consistent with the requirements for continued U.S. leadership in space.

CRAF-Cassini

Question: Part of you ELV request is for beginning integration services for a Titan IV launch of CRAF.

If we delay the start of CRAF/Cassini until next year, how much could we save in the agency's ELV request?

Answer: Delaying the start of the CRAF and Cassini missions until FY 1991 saves only a small amount of the Agency's ELV request. We are requesting only $2.1 million in the FY 1990 budget to initiate CRAF mission integration to support spacecraft design. The leading edge spacecraft to launch vehicle integration must be started in FY 1990, in order to support the CRAF interplanetary window of opportunity in 1995.

Question: CRAF-Cassini is really a double new start since it will have two spacecraft -- one to a comet for a long-term comet study mission and the other to Saturn and Saturn's moon, Titan.

What is the total cost of these two spacecraft (your latest project status report to the Committee says about $1.6 billion)?

Answer: The current total project cost estimate for the Comet Rendezvous Asteroid Flyby (CRAF)-Cassini mission is approximately $1599 million. The combined mission costs are significantly lower than if the missions were to be done separately: the CRAF and Cassini stand-alone costs are approximately $1050 million and $1075 million, respectively.

Question: How much does the cost estimate increase if you include the cost to two Titan IV ELV's and the remaining cost of launch plus 30 days?

Answer: The cost of launch services for the CRAF-Cassini mission, including the Titan IV launch vehicles, is approximately $610-615 million. The cost of launch-plus-30-days is included in the development cost of $1599 million.

Question: One serious problem with the Galileo mission to Jupiter, which you've apparently resolved, was that the spacecraft's thrusters, which were built by the Germans, didn't originally meet your own safety standards. At the same time, you are proposing for CRAF that the Germans once again handle another single-point source of failure, the engine for the spacecraft.

What is the rationale for allowing the same foreign country that created problems with Galileo to handle a comparable component of CRAF?

Answer: NASA's rationale for maintaining an agreement to use propulsion systems for the CRAF-Cassini Program supplied by the Federal Republic of Germany (FRG) rests on these three points:

1. The spacecraft Propulsion Module Subsystem (PMS) consists of two principal parts: a reaction control system (RCS) and a main propulsion system (MPS). The CRAF-Cassini reaction control system is based on existing, proven technology and is inherently free from the kinds of problems which arose during RCS development for Galileo. The RCS for CRAF-Cassini is a monopropellant system, and is significantly different from the bipropellant system used for Galileo.

There were no problems with the Galileo main propulsion (400-N) system.

2. NASA and the FRG are implementing specific management procedures to provide NASA greater visibility and access in order to track CRAF propulsion system development more closely.

3. FRG provision of the Propulsion Module Subsystem for CRAF will save approximately 50 million U.S. dollars. NASA and the FRG have had, for several years, a tentative understanding concerning collaboration on the CRAF-Cassini Program. Based on this understanding, the FRG has budgeted for their participation and NASA has tentatively included an FRG instrument on the CRAF payload based on this arrangement. While these discussions date back several years, NASA is nevertheless taking its recent experience into account as we prepare to negotiate final agreements with the FRG. These negotiations include resolution, to NASA's satisfaction, of technical and programmatic issues arising from the problems experienced with the Galileo propulsion system. It should be noted that the FRG worked very responsively with NASA to solve the Galileo problems.

Question: How can we avoid the same kind of problems with CRAF?

Answer: In developing the CRAF-Cassini Program, NASA intends to avoid the kinds of problems that arose on Galileo. NASA and JPL management have reviewed the Galileo experience and considered its implications for future projects. Based on that review, we are taking specific steps to insure that future arrangements will:

1. Provide NASA greater visibility and access to track the propulsion system development more closely.

2. Require that the FRG provide a monopropellant thruster, early in the program, for qualification verification testing at a U.S. facility; and perform flight acceptance verification tests of several flight monopropellant thrusters at a U.S. facility.

Dependence on Sole-Source Suppliers for Critical Materials/Systems

Question: Last November, NASA awarded $17 million in advance contracts to Avtex, a fourth-tier subcontractor to Morton Thiokol on the solid-rocket booster, because the company was about to go out of business and was the sole manufacturer of rayon used to insulate solid rocket boosters for the space shuttle.

Why did this bail out occur, surely NASA or Morton Thiokol knew that Avtex was in financial difficulty and that this kind of situation was possible?

Answer: Avtex is the sole source supplier of rayon for not only the NASA Space Shuttle but also for numerous other defense related programs involving solid rocket motor nozzles and re-entry vehicles. The announcement by Avtex to cease production last November was a surprise to all of these programs. This is attributable in part to Avtex being a subtier contractor. Also, according to statements by Avtex officials at that time, the severity of the financial problem was not apparent to Avtex management until very shortly before the announced closing.

Question: Don't you require your prime contractors on major systems like the shuttle or the station to know what the "single points of failure" in the production system are?

Answer: In NASA programs which have entered the design and development phase, NASA is requiring prime contractors to identify single points of failure and offer potential solutions such as developing a substitute material or process, designing around a material or process, or developing a second source.

Question: After the Avtex incident, the National Security council directed NASA and several other federal agencies to develop a comprehensive list of these kind of sole-source suppliers that could shut down a major program or operation like the shuttle.

b. How many of these single-points of failure does NASA have and how do they break out by program area?

Answer: NASA is currently identifying domestic, sole source suppliers. The raw data gathered to date is being refined and verified by further review at NASA Centers/Prime Contractors. This data is preliminary, meaning that none of the items or companies have been verified as being sole sources.

b. Currently, NASA cannot say how many truly single points of failure exist or how they break out by program area until this review is completed, sometime this summer.

Question: Would something as far down the line as the Avtex problem (4th tier subcontractor) show up on this list?

Answer: NASA has tasked the Centers/Prime Contractors to identify sole source subcontractors below the second tier level; however, it would be very difficult to assure that all single source suppliers at every subcontract level have been identified and are currently available as a reliable source.

Question: What steps are you taking on the Station program, since it's relatively new, to avoid this kind of problem?

Answer: The Space Station program is in the preliminary design phase and not in the design and development phase when the identification of potential sole sources or processes is initiated. When the Station program enters the design and development phase, the associate contractors will be required to identify potential single sources.

Question: Doesn't the Avtex incident make a good case for strategic planning?

Answer: Determining criticality and potential solutions is an extremely complex undertaking because there are a wide range of potential situations which could exist. As already stated, it is very difficult to assure that all single source suppliers at every subcontractor level are identified. Also, the adequacy of sources versus the single source item is an issue. For example, Ammonium Perchlorate is not a single source item; however, the loss of one supplier has had potential program ramifications. In addition, the evolution of technology can cause problems. An item which today can be procured from several sources may become critical two or three years from now as technology and market conditions evolve. All these situations can nullify the best strategic planning. The potential solutions such as developing a substitute material, process, or second source; designing around a material or process; or buying a system life of supply of an item are costly ones. NASA must weigh the costs of the solutions with the likelihood of experiencing a problem caused by a single point of failure.

ACTS Program

Question: For something like the sixth year in a row, the OMB has taken out funds for ACTS, and I feel that we in the Congress, for the sixth year in a row, will restore those funds. Two years ago, the Committee insisted that NASA rescope this program and agreed to have RCA take over the subcontract from TRW, and then capped the program's total cost at about $400 million. Is NASA living within that cap?

Answer: According to a letter dated January 22, 1988, signed by Senator Proxmire and Congressman Boland, the total program costs for the Advanced Communications Technology Satellite will not exceed $499 million. The total runout costs for the program are currently within that limit.

Question: What will you need in 1990 to meet the ACTS flight now scheduled for 1992?

Answer: If the program were not terminated, the FY 1990 funds needed for ACTS would be $62.8 million and for ACTS experiments would be $4.5 million.

Workforce

Question: One of the issues which has long concerned me is the issue of workforce readiness.

The U.S. is behind Japan and almost all other industrialized nations in producing scientists and engineers.

I'm told that your own internal studies show that 45 percent of NASA's top 2,500 senior managers could retire today, and that within two years the number jumps to almost 70 percent.

What steps is the agency taking to address its own workforce readiness problem and what steps would you recommend to the Congress as a solution to this problem?

Answer: NASA established a Human Resources Council of senior managers under the leadership of the Associate Deputy Administrator to oversee the integration of workforce readiness with mission/program plans, including addressing various issues caused by the impending retirement of many who entered the agency during the Apollo years. We are trying to deal creatively with issues such as repositioning staff to support the development of Space Station Freedom. The council has caused heightened attention to recruitment and retention to head off any degradation of the quality of our workforce. In addition, NASA has requested an augmentation of our Civil Service ceiling to restore the agency's core capability, which has suffered during years of retrenchment.

In the near-term, we have several tools available to keep us competitive as an employer, for example:

1. Special salary rates for increasing numbers of positions such as accountants/auditors, industrial hygienists, pilots, and clerical assistants.

2. Appointing people above the first step of their grade because of superior qualifications and competing offers.

3. Direct-hire authority for professional engineers, aerospace technologists, and medical officers which enables us to make on-the-spot offers to qualified candidates.

4. Enhance the SES bonus pool to permit more appropriate recognition of performance as well as enable the payment of recruitment/retention bonuses to enhance recruitment and mobility of senior executives.

On July 7, President Bush proposed legislation that would increase senior executive pay by 8-25 percent and would allow higher salaries to up to 200 critically skilled employees. We recommend that Congress enact this legislation. Implementation of President Bush's proposal, along with the tools described earlier in this response, will allow NASA to address the workforce readiness problem in the short-term. However, more fundamental reform of the pay system may, be required to meet our future needs, we understand that OPM is conducting a study of locality-based pay, which might enable the Federal Government to be more competitive by responding to local market pay rates. In addition to locality pay, other additional flexibilities may need to be considered, such as:

1. Allow superior qualifications appointments for all grade levels. The current authority is restricted by statute to GS-11 and above. The flexibility would allow us to make offers above the first step of a grade to all candidates who posses superior qualifications.

2. Expand the size and number of demonstration projects to allow larger experiments in alternative personnel systems.

3. Remove the statutory cap from special pay rates so the Government can compete for shortage occupations. The special rates for engineers at the entry level continue to lag behind our private sector competitors.

4. Exempt student programs, such as the Cooperative Education Program, from Federal ceiling restrictions. This is one of the

most advantageous recruiting programs for Federal agencies, providing exposure to Federal work, allowing affirmative action recruitment of minority students into the pipeline for technical jobs, and, in general, enlarging the nation's pool of technical professionals.

We will work within the Administration to present our views and to help develop recommendations for the federal pay system that will enable NASA to recruit and retain the high quality employees that it needs.

Question: Dr. Fletcher expressed concerns in the past about the $80,700 pay cap for senior NASA managers.

Dr. Fletcher recommended to me in a February 1989 letter that the cap be raised to $120,000.

Mr. Myers, do you also support this proposal?

Answer: I fully support President Bush's proposal. The $120,000 figure is the salary proposed for Executive Level IV by President Reagan in January based on the recommendation of the 1989 Commission on Executive, Legislative and Judicial Salaries, the Quadrennial Commission. Executive Level IV has been established as the cap for Senior Executive Service (SES) salaries. As you know, the Congress did not approve President Reagan's proposal. More recently, President Bush has proposed an increase in the salary of Executive Level IV to $100,900.

To raise SES salaries up to this level would accomplish two major objectives: 1) bring salaries of top Federal executives into a more favorable competitive range with salaries for comparable positions in private industry, strengthening our ability to retain our top people; and 2) send the message to Federal executives that they are valued by the people they serve.

Question: What is magic about $120,000 -- what were the assumptions behind this figure?

Answer: The $120,000 amount was the result of the Quadrennial Commission's attempt to set salaries for government executives at relative 1969 pay levels, adjusted in constant dollars.

Question: If the cap is not lifted, do you have any estimates as to the impact on the senior level staff in fiscal year 1990 -- how many do you expect would leave the agency in FY 1990 for a higher-paying job in industry?

Answer: We have no way to predict actual numbers of SES separations in fiscal year 1990 if the pay cap is not lifted however, the increased losses we are already experiencing in FY 1989 are alarming. As of July 3, we have lost 45 SES employees and know of seven more losses by July 31, exceeding our losses for this same period in FY 1988 by 16 and exceeding our FY 1987 losses for this period by 25. The disturbing fact is that NASA executives are becoming more vocal about their dissatisfaction by leaving government service and seeking employment in the private sector.

Our FY 1989 SES separations (including retirements and resignations) are ahead of the comparable months of FY 1988 by 27 percent. Since 1986, we have noted a growing trend among our SES toward earlier voluntary retirement, from 60.6 years average age in 1986 to 58.1 years in 1989. By FY 1990 33 percent (165 members) of NASA's SES contingent will be eligible for retirement. We have collected some anecdotal information that suggests that those of our NASA executives who seek meaningful employment in the private sector are finding rewarding jobs. We might reasonably conclude that these trends will continue into 1990 and that, without the incentive of a substantial pay increase, a large portion of those eligible to retire from Federal service in FY 1990 will do just that, collect their government retirement, and spend several productive years in private industry.

Shuttle Solar Backscatter Ultra-Violet Instrument

Question 1: The Shuttle Solar Backscatter Ultra-Violet Instrument (SSBUV) is an ozone monitoring instrument. The Friends of the Earth contacted Dr. Fletcher in January 1989 expressing their concern about the agency's decision to remove the SSBUV from the February 1989 Discovery Space Shuttle flight. They urged that NASA include the SSBUV on the next shuttle flight.

In your response, Admiral Truly, you indicated that the SSBUV was scheduled on STS-34 in October 1989. Why did you postpone the SSBUV payload until October?

Answer: The decision to remove the Shuttle Solar Backscatter Ultra-Violet (SSBUV) instrument from the February 1989 Discovery flight (STS-29) was not made lightly. Rather, it was made to assure sufficient shuttle performance capability to reach a backup Trans-Atlantic Abort (TAL) site, in the event of an emergency.

The SSBUV was reassigned to the upcoming STS-34 (Galileo mission) scheduled for launch in October 1989. In addition to the STS-34 flight, five additional missions have been identified for SSBUV which will provide flight opportunities into the mid-1990's. While the difficult decision to remove SSBUV from STS-29 meant a slip in the first flight for this important ozone measurement instrument, all science objectives will be satisfied with the STS-34 mission and subsequent reflights of SSBUV.

Question: President Bush has expressed his commitment to the global environment and the phaseout of chlorofluorocarbons. How does the budget request reflect the President's commitment to the global environment and how much is in your budget for these activities?

Answer: NASA is a principal agency for support of the President's commitment to a better understanding of the global environment. Through programs currently underway and discussed in our strategic planning, the agency is playing a key role in contributing to global change research. As discussed in the recently released "Global Change Research Program", NASA's effort in global change research is divided between focused programs and contributing programs. As defined by the report: A focused program is defined as an agency program or activity designed specifically to study global environmental changes or global processes which constitute part of the Earth's environmental system." At NASA, an example would be the advanced technology development work for the proposed Earth Observing System (Eos).

A contributing program is an activity which was established and primarily justified on a basis other than the specific study of global change, but which has the potential to contribute substantially to global change research." At NASA, an example would be the previously-approved Upper Atmosphere Research Satellite (UARS) program.

NASA is responsible for Earth science research from space, including those studies of broad scientific scope that study the planet as an integrated whole. Associated efforts include related process studies; sub-orbital and ground-based studies; remote-sensing and advanced instrument development; improvement of techniques for the transmission, processing, archiving, retrieval, and use of data; related scientific models; and other research activities in atmospheric, oceanographic, and land sciences.

The NASA portion of the U.S. Global Change Research Program consists of continuing support for Research and Analysis programs, expansion of the concept of interdisciplinary research programs, completion of approved satellite programs including the Upper Atmosphere Research Satellite (UARS), the joint U.S./French Ocean Topography Experiment (TOPEX/POSEIDON), and the NASA Scatterometer (NSCAT) on the Japanese ADEOS platform. The outyear elements include a proposed series of Earth Probe missions and initiation of the planned Earth Observing System (Eos), which are the first elements of the Mission to Planet Earth initiative recently endorsed by the President.

Using definitions and descriptions described above as a guide, NASA is spending $14.5 million on focused efforts in global change research in FY 1989, and the agency proposes to spend $21.5 million in FY 1990, a 48% increase. Our contributing efforts will total $399.2 million in FY 1989, with an increase to $412.6 million proposed for FY 1990.

Question: EPA recently released a draft two-year study on global warming which includes a strategic plan to limit warming and eventually reverse the trend. The plan calls for such tactics as charging users of fossil fuels emission fees; major reforestation programs; and a total phaseout of CFC's. These recommendations are very significant policy implications. Is there anybody in charge of the nation's policy efforts in the area of global warming? There are many players -- ranging from the Department of State to NASA, yet to my knowledge nobody is coordinating the policy. Am I right?

Answer: NASA believes that a coordinated Federal policy toward global change research is essential if the nation is to receive the necessary results from such efforts. Recognizing the necessity for such a coordinated Federal role, the Office of Science and Technology Policy (OSTP) established the Committee on Earth Sciences (CES) within the Federal Coordinating Council on Science, Engineering, and Technology (FCCSET) to help provide this coordination.

To date, the CES has been quite successful in providing a forum for agencies to cooperate on global change research planning and development. As evidence of this joint effort, the CES prepared a report, "Our Changing Planet: A U.S. Strategy for Global Change Research," which was submitted along with the President's FY 1990 budget submission. The report described the scientific knowledge needed to accurately predict global change effects on Earth.

The planning process outlined in the strategy report has recently been completed with the September 1, 1989, CES release of the global change research program, "Our Changing Planet: The FY 1990 Research Plan." The plan discusses objectives and specific aspects of global change research and explains how each of the participating agencies is meeting national goals through its current and proposed programs.

The detailed planning for the U.S. program is being conducted by the CES in conjunction with the scientific community through the National Academy of Sciences Committee on Global Change. In addition, the CES has encouraged participating agencies to coordinate their programs with members of the international scientific community and foreign governments and agencies.

NASA has been an active participant in the CES deliberations and planning sessions. The agencies of the CES have made a concerted effort to deal with the Committee in an open and cooperative fashion. Moreover, there is a need to maintain a long-term commitment to a broad Global Change research program. The Committee on Earth Sciences is an effective forum to ensure that such a commitment is maintained.

As far as specific policy efforts which are underway today or which would evolve from the programs underway through the coordination of the CES, NASA is not in a position to comment. NASA's mission within global change efforts is to help provide policy makers with the information and understanding of the Earth's environment necessary to enable them to make informed and intelligent policy decisions.

Question: Does NASA see itself as the key Federal agency in orchestrating U.S. efforts on global environmental problems?

Answer: As noted above, NASA is an active and key participant in the Federal effort to provide coordinated global change research. Within that framework, there are various activities, most notably remote sensing from space, for which NASA would have the lead responsibility. However, the agency is only one of many dealing with the global change issue, and does not believe that it would be appropriate or helpful for any one agency to be "orchestrating" U.S. efforts on global environmental problems. The issues are multi-agency in nature and require a high degree of cooperation.

Question: When will an interagency group be established to deal with the nation's global warming policy?

Answer: NASA believes the Committee on Earth Sciences (CES) has been an active and effective interagency group in coordinating the Federal Government's global change research efforts. CES was established in 1987 and has been the major force in successfully bringing agency representatives together to coordinate these efforts.

Question: Please describe NASA's role in the global climate/ stratospheric ozone depletion issue and whether you believe NASA is doing enough in this area?

Answer: The effort to understand the extent and significance of stratospheric ozone depletion is an important one for the United States and the world. NASA has been a leader in this effort, providing both technical expertise and coordination to the investigation of ozone depletion.

NASA plays a leadership role through its Upper Atmosphere Research Program (UARP), as mandated by Congress under the Clean Air Act of 1976 and the 1976 NASA Authorization Act. The program aims to expand our knowledge about the important upper atmosphere environment. An improved scientific understanding of the physical, chemical, and meteorological processes that control the concentration and distribution of atmospheric ozone will provide us a basis for predicting the impact of natural and man-made phenomena on the ozone layer.

The NASA program has used aircraft, ground studies, lab research and eventually satellite instruments to examine and measure the nature of ozone in the upper atmosphere. Data from the NASA Total Ozone Mapping Spectrometer (TOMS) and the Solar Backscatter Ultraviolet (SBUV) instruments on the NASA Nimbus-7 satellite have been available since the late 1970's and have provided a continuous record of total column ozone. In an effort to build upon this data, NASA, along with the National Oceanographic and Atmospheric Administration (NOAA), the National Science Foundation (NSF), and the Chemical Manufacturers Association (CMA), mounted several major observation expeditions. A major airborne campaign using NASA planes based in Chile was carried out in August and September 1987 to study the sudden and unanticipated decrease observed in the abundance of ozone over Antarctica in the Austral spring since 1979. Results from that study have provided data which directly implicate man-made chemical compounds, chloroflourocarbons (CFC's), in the enormous ozone loss over this remote region in the Southern Hemisphere. In addition, observations from a remote Antarctic ground station and airborne balloons were made in 1986 and 1987 to gain further understanding of the region.

Meanwhile, NASA, along with NOAA, the Federal Aviation Administration (FAA), the World Meteorological Organization (WMO) and the United Nations Environmental Program (UNEP) convened the Ozone Trends Panel in late 1986. The panel, which involved over 100 scientists, was set up to reevaluate two 1985 reports on the decrease in ozone levels, one on springtime Antarctic levels and the second on a global scale. The panel issued its report in March 1988, and among its conclusions was the finding that there was "undisputed observational evidence that the atmospheric concentrations of source gases important in controlling stratospheric ozone (CFC's, halons, methane, etc.) continue to increase on a global scale as a result of human activities."

NASA scientist Dr. Robert Watson is a noted expert in the area of ozone depletion, and recently cochaired the Ozone Scientific Assessment Panel, one of four assessment panels mandated by the Montreal Protocol. The panel was set up to provide a scientific review of the current understanding of stratospheric ozone, prepared by international scientific experts who are leaders in their respective fields.

In the future, NASA will propose additional space-borne instruments for the measurement and tracking of ozone concentrations and characteristics in the upper atmosphere. These include deployment of additional TOMS instruments on a variety of satellites and a battery of instruments on the proposed Earth Observing System (Eos). Moreover, instruments on previously approved missions, such as the Upper Atmosphere Research Satellite, will help NASA and the United States maintain our leadership in this important area of research.

These efforts underscore some valuable lessons which were learned as part of the ozone research. The success of the research and acceptance of its findings was due in large part to the close coordination with other Federal agencies, the scientific community, and international organizations. Moreover, the existence of atmospheric programs at NASA, NOAA, and NSF with a long term commitment to a broad research effort provided the stability and opportunity needed to conduct the necessary research and analysis. One major outcome of these efforts, the Montreal Protocol to limit CFC production, was made possible because of the cooperative and international nature of the ozone research.

QUESTIONS SUBMITTED BY SENATOR ROBERT C. BYRD

AdaNet Program in West Virginia

Question: Please provide an updated summary of the AdaNET program in West Virginia, including accomplishments within the past year, and a status report on the implementation of the services listed above.

Answer: The AdaNET project began in 1987 as a tripartite effort among NASA, the Department of Defense and the Department of Commerce. Though the latter two agencies provided initial contributions of funding and in-kind support, they requested that NASA serve as the lead agency for the federal government with respect to overall project management responsibility and continued funding.

The project has been focused on investigating the feasibility of establishing a commercial venture located in the State of West Virginia to develop and operate a system of electronically networked databases and information resources for the purpose of:

- fostering the transfer of software engineering concepts, methodologies and implementation techniques, with particular emphasis on Ada;
- creating and making available a software library system repository to support the distribution of reusable software components developed as a part of the federal government's computer software development efforts; and thereby
- encouraging and stimulating the transfer and use to the private, industrial sectors of the U.S. of knowledge/ technology and reusable software program parts developed in the federal establishment -- as well as assisting in appropriate dissemination efforts.

The AdaNET Software Repository is moving gradually to be self-supporting commercial organization. In providing the Ada community with information sharing, depository services, and valuable software engineering expertise. AdaNET is operating on a for-profit basis and is beginning to provide added capability for solving many industrial and manufacturing problems. From the outset, the federal participants in AdaNET, NASA, Departments of Defense, and Commerce adopted an approach which required a collaborative effort with private industry. The specific approach selected involving federal participation was stimulated by an unsolicited proposal from the MountainNET Corporation of West Virginia as a part of the West Virginia "Software Valley initiative." MountainNET was subsequently selected to provide the industrial lead for the project. The Office of Commercial Programs at NASA decided to utilize existing NASA-supported capability residing at the Research Institute of Computing and Information Systems (RICIS) at the University of Houston - Clear Lake, under its cooperative agreement with the Johnson Space Center, to provide overall technical leadership for the project; this is due to RICIS's experience base in the Ada language and the University's related software engineering expertise.

Question: The FY 1989 operating plan for NASA includes $2.7 million for the AdaNET project in West Virginia. Is the program accomplishing all that NASA set out to do? Please provide for the record a list of the specific activities which are being carried out, along with a list of accomplishments. Please give examples.

Answer: Following the formal initiation of the AdaNET project in October 1987, Fiscal Year 1988 funding in the amount of $1.3 million was provided to carry out necessary work and activities according to planning guidelines agreed upon among NASA and the Departments of Defense and Commerce. Thereafter, $2.3 million has been made available to the AdaNET and related projects in fiscal year 1989.

The initial six-month effort was intended to be a planning and program definition phase for an initial feasibility stage of the program. A strategic plan, a tactical plan, and supporting and operational business plans were to be the products of the initial phase of the feasibility program. Market research efforts and system prototyping tasks were planned and implemented as a part of the planning and definition phase.

During the course of this initial phase, it became apparent: (1) that the initial efforts were not sufficient to produce conclusive results and that additional work would be required, (2) that additional technical expertise was needed in the program, and (3) that the project management structure needed to be strengthened. In response to this, the RICIS appointed a project manager (Prof. Peter Bishop, Director of RICIS Information Management technical area) to oversee the program.

Phase I was extended and efforts were extended to complete this initial planning and definition phase. As a part of this work, a preliminary version of a networked database was prototyped and demonstrated at the TRIAda Conference in Charleston, West Virginia, in the Fall of 1988.

To further strengthen the program, the Johnson Space Center appointed a JSC Technical Director to oversee the RICIS AdaNET project (R.B. MacDonald, Assistant for Research, Education, and University Programs). Following this, a project organizational and management structure was developed, and adopted by the AdaNET project.

An operational plan which consisted of the organizational structure and work breakdown plan, etc., were developed for an initial exploratory implementation phase to begin early in 1989 These planning tasks are in the process of being finalized and work has been initiated.

The AdaNET program concept is for an advanced, commercial development network for Ada software engineering applications, located in Morgantown, West Virginia. The AdaNET electronically networked databases are the heart of the system and conceptually consist of: (1) an electronic network - made up from currently available commercial services and installations, (2) an Ada Information System (AIS) database, and (3) a second database, the Dynamic Software Inventory (DSI).

The AIS is to be a structured database containing a variety of information identified to be useful to software developers in organizations who either already are or who plan to be developing complex software systems as part of their business enterprises. This information will be of substantial value to professionals working in these areas.

The DSI is to be a library repository for reusable software modules that can be accessed via the electronic network. This entails designing and constructing a suitable library referencing system and the physical electronic storage library facilities for storing and searching out such software modules. The actual modules are a part of other ongoing software development programs within the Federal Government These include programs such as NASA's Space Station and the DoD SDI. It is not planned to produce such modules as a part of the AdaNET project.

At this time we believe the electronic network element to be a relatively straight forward part of the project. However, it is important that it be properly engineered to ensure a technically adequate and cost effective electronic communications network that will be of service well into the future. The design of such a network calls for an adequate level of communications engineering/computer networking expertise. The rudiments of a prototype network structure have already been put in place by MountainNET There are questions and issues concerning the existing network approach that need to be addressed in subsequent development phases of the AdaNET program.

Question: The AdaNET effort has now begun to generate substantial positive feedback from on-line users which demonstrates its potential for cost effectiveness and qualitative benefits. What is NASA doing to ensure continued funding of the AdaNET initiative in West Virginia? Please provide an update on funding plans for the future to ensure continuity of funding for this valuable program.

Answer: In order to accomplish the additional work required for the AdaNET project prior to the point where self-support may become feasible, NASA intends to request an average amount of $3 million per year beginning with FY 1990 as part of the Technology Utilization budget under the NASA Office of Commercial Programs.

National Technology Transfer Center, West Virginia

[The following questions from the Subcommittee were forwarded together with the text of a draft Executive Summary which was included with an early version of the "Preliminary Definition/Design Study" for a National Technology Transfer Center (NTTC). This draft was made available informally in response to a request from the Committee staff, along with the caveat that the document was not approved by NASA, upon review of the entire study, in fact decided not to include the Executive Summary. This represents, therefore, an unofficial draft which was not forwarded to the Committee as part of the formally submitted study. Accordingly, it must be considered an unapproved document as far as NASA is concerned.]

Question: The NASA budget contemplated for the proposed National Technology Transfer Center includes $4 million in FY 1990, and $5 million in each of Fiscal Years 1991 through 1994. Please provide for the record, a table showing anticipated funding from other Federal agencies, such as the Department of Agriculture, the Department of Defense, the Department of Commerce, the Environmental Protection Agency, etc. To what extent do the funding levels projected for these agencies indicate a desire to support the effort and a need to make available to America's entrepreneurs, small businesses, large businesses, scientists, and engineers the benefits of federally funded transferable technologies? If the necessary funding of $4 million were to be made available in FY 1900 for the NTTC, how, specifically, would the funds be used?

Answer: In section 4.4, page 35, of the NTTC report forwarded to Congress on February 7, 1989, it was noted that "the Task Team proposes that a cost-sharing arrangement be negotiated among interested federal agencies and that it may be scaled to the size of the agency budget." However, no cost-sharing arrangements have been pursued. If a total of $4 million were to be made available for the NTTC in FY 1990, this would reflect roughly the resources breakout shown in Figures 4.1 and 4.2, of that report scaled down by approximately 20%, with the reduced funding absorbed in the data collection effort. Total funds required for the first year, as estimated by the report, were $1.1 million in operating costs and $3.9 million in development costs.

Question: Please explain how the NTTC would enhance the technology transfer functions of various federal agencies and not compete with those agencies or duplicate their efforts. Give examples.

Answer: The NTTC will not to duplicate the missions and activities which are in place at the various agencies. New resources which are proposed would relate primarily to the creation of new linkages not currently possible or feasible and/or the creation of new databases and tools for communications, marketing, outreach and financing that are not now available to federal agencies, individually or collectively.

Question: Some competitor nations seem to be particularly adept at the concept of technology transfer. In fact, some competitor nations reportedly adopt technology developed in the United States at great cost, then transfer the technology into products which, in turn, capture markets that could have been dominated by the U.S. firms that first developed the technology. Please explain how the NTTC could possibly have addressed this problem (in the case of the development and marketing of the VCR, for example) in the past and how it could in the future. Isn't it true that if the proposed NTTC could stimulate even one large scale transfer of government financed technology into a useful product that could be marketed worldwide, that single episode would, in effect, justify the entire cost of the NTTC?

Answer: There has been substantial confusion, due in large part to media misinterpretations, regarding the term "technology transfer." As currently used in the media, "technology transfer" connotes undesirable and/or detrimental outflows of U.S. technology in ways which tend to give economic, technological or other competitive advantages to U.S. industrial competitors or adversaries It appears that this meaning is being increasingly adopted in communications, governmental and non-governmental, relating to export control. In this sense, "technology transfers" can clearly run counter to U.S. interests at a variety of levels. Certain agencies such as NASA, place stringent limitations on the overseas dissemination of data derived from its technology transfer activities. Those limitations are not determined by such factors such as foreign domination of the VCR and other semiconductor oriented markets.

On the other hand, "technology transfer" as it inheres in the meaning and intent of the National Technology Transfer Center refers to secondary applications of technology funded and created for one purpose or mission but having utility, either directly or in modified form, for purposes other than those for which the technology was originally intended. It is in this sense that the term "spin-off" was created. It is possible that the value of "spin-offs" to be derived from the projected NTTC activities could ultimately exceed the operations and development costs associated with NTTC implementation.

QUESTIONS SUBMITTED BY SENATOR FRANK R. LAUTENBERG

Advanced Communications Technology Satellite Program/ Advanced Rotary Engine Program

Question: Please provide me with a status report on the Advanced Communications Technology Satellite (ACTS) program and the Advanced Rotary Engine Program.

Answer: The Advanced Communications Technology Satellite (ACTS) objective is to develop the advanced technologies in Ka-band and use these technologies in an experiment program. This program will prove the utility of on-board switching (the baseband processor) and an intricate multibeam antenna that will allow simultaneous communications transmissions to different terrestrial locations.

The U.S. user community, representing the private sector organizations and other government agencies, will develop and execute experiments that will test and evaluate the ACTS technologies under various application scenarios. The ACTS key technologies include high Effective Isotropic Radiated Power (EIRP); fast-hopping multiple beam antenna; onboard intermediate frequency and baseband switching; and Ka-band components.

During FY 1988, in response to Congressional direction, NASA successfully restructured the entire ACTS program. Changes to the contractual arrangements and the assumption of a more proactive management role by NASA were made, while the momentum in the ACTS development activities continued toward achieving the new shuttle launch readiness date of May 1992. The contracting arrangements were changed to make the Government the system manager with COMSAT and General Electric Astro Space associate contractors.

Under this restructuring, further cost growth is limited by the contract "cap" imposed on each contractor. The prime contractor, General Electric's Astro Space Division, will assume the responsibility of building the spacecraft multibeam communications payload formerly being developed by TRW, and NASA's Lewis Research Center, Cleveland, Ohio, will now manage the ground segment part of the contract being built by COMSAT and formerly managed by General Electric. The latter change results in a reduction in costs to help accommodate the cap.

In FY 1989, delivery of several engineering and flight model components and the completion of many critical design reviews have signaled the shift in emphasis from design to development. Development activities for both the engineering model integration and test and the flight model component manufacturing are underway.

During FY 1990, the ACTS multibeam communications payload package will be integrated with the spacecraft bus. Integration and test of both the flight system and ground stations will be initiated in FY 1990. Environmental tests of the flight system will be completed in FY 1991.

Networks using Very Small Aperture Terminals (VSATs), nominally defined as ground terminals having antenna diameters less than 2.4 meters (10 feet) and being low in cost, are presently the fastest growing application of communication satellite technology. The use of ACTS technology in advanced VSAT networks will open a major new market to the industry, expanding the VSATs role from primarily point-to-multipoint data networks to fully interconnected mesh networks capable of supporting voice, data and video service requirements.

The ACTS was not included in the President's FY 1990 budget proposal according to a long standing policy of the Administration to move commercially relevant technology to the private sector. However, if directed by the Congress to pursue this project, the estimated cost to completion (FY 1990-FY 1994) is $112.7 million, or 23 percent of the total cost.

Status report on the Advanced Rotary Engine Program

The Advanced Rotary Engine Program has been making progress toward major program goals by reducing the fuel consumption and increasing the power density. Multi-fuel capability has been demonstrated. The program is, and will continue to be, funded at the $3.1 million level. The Deere and Co. technology development contract continues to pursue technologies such as stratified charge combustion for minimum fuel consumption, lightweight rotor concepts for higher speeds, adiabatic coatings for low heat rejection, turbocharging for increased power at altitude, and bearings and seals to reduce friction losses. The NASA Lewis Research Center development of analytical computer codes to guide the improvement of the combustion process for decreased fuel consumption is continuing, along with the initiation of experiments at the University of Michigan, to validate the analytical codes. A competitive Request for Proposal has been issued for continued technology development beyond the current Deere and Co. contract. Contract award is anticipated in the September-October 1989 timeframe.

Space Station

Question: What is the projected production schedule for the space station communications tracking system and the space station platform?

Answer: Design and development testing for the communications and tracking system is in progress now and will continue through late 1991. Fabrication and assembly of the flight unit will occur from mid-1991 to late 1992. Integration and test will then begin and continue through mid-1993, to be followed by final integration into the resource nodes of the manned base.

Design and development testing for the polar platform is in progress now and will continue through late 1992. Fabrication, assembly, integration, test, and verification will take place between early 1991 and early 1995, to be followed by integration with the scientific instruments that will make up the payload. Current OSS planning supports a 1996 launch.

National Aero-Space Plane

Question: Please provide me with a status report on the National Aero-Space Plane. What are its benefits to the Defense Department (DOD)? What are its benefits to civilian technology?

Answer: Over the past several weeks, a Working Group of the National Space Council, chaired by its Executive Secretary, with representation from member departments and agencies, as well as the Joint Chiefs of Staff, held an extensive review of the NASP program.

The Space Council met on 30 June to review and recommend to the President the program and funding for the NASP.

On 20 July, President Bush approved the recommendation of the Space Council. The recommendations are as follows:

-- Within currently approved DOD budget levels, increase NASP funding by $27 million in FY 1990, $158 million in FY 991, $233 million in FY 1992 and by appropriate amounts in FY 1993 and FY 1994.

-- Retain an appropriate joint DOD/NASA management structure.

-- Restructure the NASP technology program to focus only on research and technology objectives.

-- Extend the technology development phase of the program approximately 2 1/2 years and plan to begin experimental.

The Space Council will review the program prior to initiation of vehicle development.

NASA cannot speak for the DOD as to their benefits from the NASP, however, if the NASP were successful in demonstrating a useful single-stage-to-orbit capability, it would have far ranging implications. Both single stage to orbit and two stage to orbit air-breathing vehicles will be feasible. The NASP program could well be a technology driver for the twenty-first century technology base. The NASP program directs research to a technology horizon which is more advanced than any envisioned for current or planned U.S. aircraft. This long range focus is important in an age where national security and industrial competitiveness are based increasingly on high technology.

The knowledge gained from a NASP program will find its way into civil/commercial supersonic flight in the early 21st century. High temperature materials and/or alternative fuels developed as a result of the NASP program may reduce weight and increase the operating efficiencies of the 21st century flight vehicles. In the area of subsonic flight, avionics advances could lead to new generations of systems based on NASP-derived technologies.

The National Aero-Space Plane is expected to yield a high payoff for our nation in the 21st century. Sustained U.S.

preeminence in aeronautics with consequent advantages in international trade . . . economic and social benefits which almost invariably accompany technological leadership . . . national pride and prestige . . . and good jobs and career opportunities.

QUESTIONS SUBMITTED BY SENATOR J. ROBERT KERREY

Budgeting

Question: Do you have a standard method of determining life cycle costs for all NASA systems from the shuttle to the Space Station to planetary missions? If so, please describe. If not, how do you cost out systems?

Answer: NASA does not have a standard cost estimating methodology for determining life cycle costs. With a few exceptions, most NASA projects are unique, one-of-a-kind missions. As a consequence, historically a great deal of attention has been paid to improving our estimating methods for determining research and development costs. Operational support issues, such as spares estimating, sustaining engineering requirements, and obsolescence, have not been major factors. However, the emergence of systems -- such as the Space Shuttle, Space Station Freedom, and serviceable scientific observatories -- which require an understanding of operational support issues spurred interest in developing cost estimating models which take these into account. The method NASA uses for formulating cost estimates for proposed new programs include an extensive review of the program's research and development estimates by a team of experts. Parametric models are coupled with detailed engineering estimates in this process. The additive costs to the existing space transportation and space tracking and data acquisition capabilities are identified, as are the unique facilities and civil service personnel requirements. Mission control, science support, and data analysis cost estimates are developed for the spacecraft's design mission duration. For systems having relatively indefinite operational lifetimes -- such as the Space Shuttle and Space Station, these estimates have been augmented by estimates of the operational support costs leading up to a mature operational phase and a target annual cost for mature operations.

With regard to the Space Station Freedom, cost estimating models are being developed which enable the effects of design trade-offs on operational costs to be more comprehensively assessed. The model equations are being refined as the design matures, enabling a better understanding of interactions among the different systems. Life cycle cost considerations are being stressed by program management, including the issuance of formal implementing instructions for generating such estimates as design changes are proposed.

Question: In the justification you have referred to a "total development program cost ceiling" of $13 billion in 1984 dollars for the Space Station. What does this include? What does it not include?

Answer: The cap includes the design and construction of all Space Station systems and elements except:

- Flight Telerobotic Servicer
- Transition Definition
- Operations Costs
- Orbital Debris Radar
- Construction of Facilities
- Transportation Costs
- TDRS Support Costs
- Civil Service Manpower
- Assured Crew Return Capability

Question: You have requested a three year commitment of funds for the Space Station. What do you see as the primary benefits of such a multi-year commitment?

Answer: The request for a three-year authorization and appropriation is based on the need for stability in the funding for the Space Station. The stability offered by this approach enables meaningful implementation of the concurrently proposed cap on development costs.

University Space Science and Technology Academic Program

Question: What kind of university/academic programs do you expect to fund under your new line item?

Answer: The University Space Science and Technology Academic Programs will provide funding for agency-wide university and minority university programs, and as mandated in NASA's FY 1988 Authorization Act, funding is also provided for the National Space Grant College and Fellowship Program.

Specific programs funded by the University Affairs and Minority University programs are as follows:

University Affairs Programs
Graduate Student Researchers
Innovative Research
Space Applications

Minority University Research Program
Historically Black Colleges and Universities
Other Minority Universities
Graduate Student Researchers Program (Underrepresented minority focus
Undergraduate Student Researchers

Question: How will these grants be made -- will NASA approve applications or will you use a merit review system like NSF?

Answer: The review and selection process for each program cited above is designed to meet each program's individual objectives. For example, the innovative Research, Space Applications and Space Grant College & Fellowship programs are merit review. The Undergraduate and Graduate Student Researchers, Summer Faculty Fellowships, Historically Black College and University, and Other Minority Universities programs are, in general, reviewed by internal NASA Center technical panels with oversight provided by NASA Headquarters.

Applications

Question: The Landsat technology has permitted forest damage assessments, farmland surveys and other efforts related to agriculture. Do you foresee any further developments in this area which would benefit agriculture?

Answer: Rigorous, basic scientific analysis of Landsat Thematic Mapper data has only just begun. The first NASA research program devoted to basic scientific use of Landsat data, which lasted three years, ended in December 1988. This work was preceded by substantive, but qualitative, applied research and detailed studies of sensor performance characteristics. It is not uncommon for the most significant scientific and applications results to follow several years after data has been received from a new sensor. The scientific community requires a period of adjustment to become familiar with a new instrument, learn how to calibrate the data, and develop new analytical approaches. Thus, there is great promise for the development of further scientific insights and more quantitative agricultural problems. With the second TDRSS in place, we will be able to look at agricultural phenomena with greater resolution, yielding improved information on agricultural productivity and condition assessment.

Also, retrospective studies of crop type, productivity, and condition over the time period of Landsat operation (1972-1989 for the Multispectral Scanner) will yield fundamentally new information about changes in crop strategies and the health of agricultural systems. The continuity of the Landsat record will make these new and fundamentally important applications possible.

Question: Nebraska is in the early stages of what, without rainfall, will be a drought. What can your technology tell me about what is going on and what is likely to happen?

Answer: Droughts are caused when very stable or high pressure areas in the large atmospheric circulation patterns of the Earth become established. These high pressure areas block the normal moisture incursions that produce rainfall in a region. We have learned that some of these situations (the 1988 drought in the central and eastern United States, for example) are related to air-sea interactions which are occurring in the South Pacific ocean.

The atmospheric circulation forces the surface layers of the oceans into complex circulation patterns of their own. However, the thermal energy from the oceans provides strong feedback to the atmosphere. This coupling is complex and not well understood, but it is known that when sea surface temperatures diverge from their normal patterns, the changes in the oceanic energy input to the atmosphere produce changes in atmospheric circulation. The drought of 1988 is related to the unusual pattern of cold water in the eastern Pacific at the Equator and warm water pools both to the north and south of this cold pool. In the northern hemisphere, the warm water is believed to have been responsible for the establishment of a series of stable stationary circulation patterns in the atmosphere consisting of a ridge over the mid-Pacific, a trough in the eastern Pacific, and a ridge of the central United States. This ridge over the U.S. effectively blocked the usual moisture flow into the region from the south.

Satellite measurements of sea surface temperature and clouds have enabled us to monitor this phenomenon better than ever before, but we do not yet have enough information to be able to predict when the pattern will break down nor the exact quantitative cause of it. When the Ocean Topography Experiment (TOPEX) and the NASA Scatterometer (NSCAT) missions are launched, we will be better able to understand the complex interactions of the atmosphere and oceans in affecting global change.

Question: What is NASA's role with respect to ozone depletion and climatic change?

Answer: Under the mandate contained in the FY 1976 NASA Authorization Act, NASA has developed and is implementing a comprehensive program of research, technology, and monitoring of the Earth's upper atmosphere, with emphasis on the stratosphere. This program, called the Upper Atmosphere Research Program (UARP), focuses on expanding our understanding of this important region of our atmospheric environment and on developing an ability to assess potential perturbations, particularly to the ozone layer. The NASA UARP is managed within the Earth Science and Applications Division in the Office of Space Science and Applications. The long-term objectives of the present program are to perform research to:

o Understand the physics, chemistry and transport processes of the upper atmosphere:

o Accurately assess possible perturbations of the upper atmosphere caused by human activities as well as by natural phenomena:

The UARP preceded the formation of the Mission to Planet Earth concept, which is a NASA umbrella term for the space observation platforms, data and information system, Earth process studies, and global Earth system models which, combined, move toward the goal of understanding global change. Mission to Planet Earth is NASA's contribution to the larger U.S. Global Change Research Program that was outlined in the report, Our Changing Planet: A U.S. Strategy for Global Change Research by the Committee on Earth Sciences (CES) that accompanied the President's FY 1990 budget. The CES is in charge of the implementation of the U.S. Global Change Program. The CES works in concert with the National Academy of Sciences Committee on Global Change, which is in charge of coordinating and directing the U.S. science effort of research.

The study of global change has been a priority within the Earth Science and Applications Division of the Office of Space Science and Applications for a number of years. The Nimbus-7 satellite, launched in 1979 to study Earth processes and still partially functioning, and the Earth Radiation Budget Satellite, launched in 1984 to measure radiation balance in the Earth's atmosphere, are just two examples of missions designed to study global change.

The current Earth Science and Applications program, which includes the Upper Atmosphere Research Satellite (UARS), the Ocean Topography Experiment (TOPEX), and the NASA Scatterometer (NSCAT), is a precursor effort supporting the Mission to Planet Earth concept which currently includes the Earth Observing System, Earth Probes, and the Geostationary Platforms. Below is a description of these missions.

UARS

The UARS mission, planned for launch in October 1991, will provide the first simultaneous measurements of stratospheric chlorine, nitrogen, hydrogen, and oxygen species, coupled with measurements of dynamical parameters (e.g., winds), and will focus on global budgets of gases important in the ozone balance.

TOPEX

TOPEX is a joint mission with the French Space Agency (CNES) designed to understand the global oceans' general circulation and the relationship to climate change using precise measurements of ocean surface topography.

NSCAT

NSCAT is a joint NASA and U.S. Navy project using satellite radar scatterometry to understand the interaction of atmosphere with the ocean and the relationship to climate change using measurements of ocean surface wind speed and direction.

Earth Observing System (Eos)

Eos, as currently defined, comprises a large segment of the Mission to Planet Earth concept, and consists of three main parts: the Polar Orbiting Platforms, the Space Station Attached Payloads, and the data and information system.

Polar Platforms: Two large NASA Polar Orbiting Platforms, complemented by one or two ESA polar platforms and a Japanese platform. The first U.S. platform (to be launched in 1996) and the ESA platform are part of the Space Station program. Each U.S. platform will have a 5-year life, and will be serviced or replaced so that a minimum total of 15 years of Earth observations will be achieved.

Space Station Attached Payloads: Instruments to be attached to the Space Station Freedom manned base for special studies from low-inclination orbit. Many instruments are identical to those proposed for the polar platforms to obtain synergistic measurements. Candidate payloads include: Earth Radiation Budget Experiment, Moderate Resolution Imaging Spectrometer, and Multifrequency Imaging Microwave Radiometer.

Eos Data and Information System (EosDIS): Gathers, processes, and archives the data arriving from space elements; to be accessible by worldwide scientific community.

Non-advocate cost reviews of the Earth Observing System are currently being held to determine the technological and programmatic readiness of the program for a possible FY 1991 new start.

Earth Probes

Earth Probes, as currently defined, is a series of small free-flying satellites for global environmental monitoring not possible on the polar orbiting platforms. The Probes would perform focused investigations to complement Eos in maintaining critical, long-term measurements. Key potential payloads include:

- o Total Ozone Measurement System (TOMS)
- o Geopotential Research Mission (GREM)
- o Tropical Rainfall Measurement Mission (TRMM)
- o Sea-Wide Field Sensor (Sea-WIFS)
- o Magnetic Field Explorer (MFE)

Currently, the proposed Earth Probes program is under study for a possible FY 1991 new start. The program is proposed to be managed similarly to the Physics and Astronomy Explorer program, in which spacecraft development is phased according to funding availability within a level-of-effort budget.

Geostationary Platform

This segment of the program, as currently defined, consists of five platforms in geostationary orbit for complete, simultaneous coverage of the Earth's globe at any one time. The conceptual plan calls for 3 U.S., 1 ESA, and 1 Japanese platform. The Geostationary platforms would complement polar platform observations by providing continuous synoptic coverage of the Earth in its entirety at very high resolution. These platforms would be added late in the Mission to Planet Earth program, with a new start envisioned for the mid-1990s and a first launch at the end of the century.

Space Transportation System

Question: The space shuttle is budgeted for five flights in FY 1989 and nine in FY 1990. This is far fewer than envisioned in flight manifests prior to the Challenger disaster. What impact does the reduced number of flights have on the per flight cost and the payload costs?

Answer: Because the fixed costs of establishing and maintaining a capability to conduct space operations are high relative to the costs associated with an individual flight, the average cost per flight is highly sensitive to the flight rate. Before the Challenger disaster, we projected a per flight cost of $115 million (FY 1988$), based on a steady state rate of 24 flights per year. Post-Challenger, with the steady state rate planned for 14 flights per year, the per flight cost projection is $209 million (FY 1988$). About two thirds of the increase in the cost per flight is due to the reduction in flight rate from 24 per year to 14 per year and the remaining is due to growth in baseline operations in the post-Challenger environment.

Payload costs, while not directly affected by the flight rate, were directly affected by the delays caused by the Challenger accident. The impacts resulted largely from the necessity to maintain the project teams in the interim. These delays have been as much as four and a half years for a number of large and expensive payloads. Estimated cost of the resulting increase in development costs for the Hubble Space Telescope, Galileo, Magellan, Gamma Ray Observatory, Ulysses, and the Upper Atmosphere Research Satellite and other affected space science payloads approaches a billion dollars.

Question: With the reduced flight schedule, how does the proportion of DOD, NASA and commercial payloads for FY 89 and FY 90 compare with proportions anticipated before Challenger? Do a greater percentage of the flights carry DOD and/or NASA payloads?

Answer: Before Challenger, the proportions of payloads manifested on the Shuttle were approximately one third DOD, one fifth commercial (mostly communications satellites), and the remainder NASA. In the FY 1989 and FY 1990 period, with a backlog of priority DOD payloads, and the DOD expendable launch vehicles not yet reaching a production rate to meet the immediate demand, the proportions are 39% DOD and 61% NASA, with no commercial payloads.

In 1991 and beyond, DOD flights drop to an average of fewer than one per year, or less than 7 percent. In addition, approximately 2.2 foreign and commercial flights per year are planned for scientific, national security, or commercialization requirements.

Question: For the payloads that have been dropped because of the reduced flight plan, what are the launch options?

Answer: The commercial communication satellite payloads that are no longer on the Shuttle, found accommodations on expendable launch vehicles, either U.S. domestic suppliers, or foreign sources. Many NASA payloads were either deferred or cancelled. In the 1992 timeframe and beyond, about 8 of the 9 previously planned DOD flights per year are now planned to be launched on DOD ELV's.

Question: What foreign payloads are scheduled for shuttle flights in FY 1989 and FY 1990?

Answer: There are no foreign reimbursable payloads manifested on the Shuttle in FY 1989 or FY 1990. However, a number of the payloads in this early period involve cooperative arrangements with foreign governments under which they provide major scientific instruments or spacecraft subsystems. Examples are the Hubble Space Telescope, Magellan, and Galileo. Selected foreign scientific payloads begin in May 1991, with Eureca, the European retrievable carrier platform, that will be placed in orbit for six months, followed by the Spacelab-J Japan/NASA mission in June 1991.

Question: In general, how do you determine which payloads will fly on shuttle and which will fly on expendable launch vehicles (ELV's)?

Answer: Payloads that require manned presence or other unique capabilities of the Shuttle fly on the Shuttle. Where it is practical to do so, NASA payloads not requiring the special capabilities of the Shuttle are assigned to fly on ELV's.

For commercial and foreign payloads, NASA will provide launch services only when these payloads must be man-tended or require the unique capabilities of the Shuttle. Exceptions to this policy are made only after it is determined that launching the payloads on the Shuttle is critical for national security or foreign policy purposes. Commercial and foreign payloads will not be launched on government-owned or operated ELV systems except for national security or foreign policy reasons.

Question: What NASA payloads will fly on ELV's in FY 1989 and FY 1990?

Answer: No NASA ELV payloads are scheduled in FY 1989. In FY 1990, the Cosmic Background Explorer (COBE) will be launched on a Delta ELV, followed by the Combined Release and Radiation Effects Satellite (CRRES) that will be launched on an Atlas-Centaur, and the NASA/West German cooperative payload, ROSAT, that will be launched on a Delta.

Question: Can existing orbiters accommodate the Space Station?

Answer: Yes, the existing orbiters can accommodate the Space Station build cycle and the planned five operational flights per year.

Question: Has the pricing policy for payloads been changed since the Challenger disaster?

Answer: Since the Challenger accident, the following have been established:

1.) Reimbursement of NASA for DOD payloads through 1991 was set at $115 million (FY 1986$) per flight.

2.) A $110 million (FY 1988$) price was established for each commercial enterprise payload, such as the Spacehab.

Other pricing policies for reimbursable payloads on the Shuttle have not been established.

Question: Is the shuttle basically a completed system now or are you seeking greater flexibility, greater thrust, more lift capacity.

Answer: If the Shuttle is to remain NASA's manned transportation capability into the next century, the systems must continue to evolve in order to reduce the cost of operations and counter obsolescence while improving Shuttle safety and reliability. With the first flight scheduled for 1992, the ASRM will also increase Shuttle lift capability by about 12,000 pounds.

Necessary improvements to the Shuttle systems are part of the NSTS Program and NASA continues to evaluate the benefits of potential modifications to Shuttle systems and operations as part of a longer term Shuttle evolution strategy. The objective is to achieve cost, reliability and safety goals for manned transportation systems.

Space Station

Question: We hear that the Space Station is the "next step" in NASA that it will advance space science, that it will enhance the development of advanced technologies. But, a lot of this sounds sort of vague.

a. What specifically will it do?

b. What can an individual, a businessman, a Senator expect to benefit?

Answer: Space Station Freedom permanently manned laboratories will enable extensive microgravity research in materials science and the life sciences. These applications require the Space Station's capability to support frequent interaction between people and equipment in a microgravity environment for extended periods of time. Some of the many potential applications of microgravity work are processing pharmaceutical substances, such as enzymes and virus crystals; developing new metallic, ceramic, and composite materials; performing medical research on bone deterioration and cardiovascular problems; and studying the long-term effects of weightlessness on people.

The manned base and polar platform will both carry observation instruments. Those instruments looking out at the universe will be new tools for research in fields like astrophysics and astronomy. Those looking back at the Earth will gather valuable data in areas like geology, agriculture, meteorology, and oceanography. The manned base will provide extensive coverage of the equatorial regions, while the polar platform will cover both low and high latitude regions of the Earth. The polar platform will be a particularly important resource for studying our planet's ongoing environmental changes as well as global problems like pollution, ozone depletion, deforestation, decertification, and climatic shifts.

The Space Station will also provide unique opportunities for technology development. Design approaches and hardware for spacecraft components can be tested before final incorporation in space systems. Approaches for building and controlling large structures in space can be developed and tested. The Space Station development process itself is already contributing to the U.S. technology base in such areas as automation, robotics, information systems, and environmental control.

Last, the Space Station will help us prepare for manned exploration missions to destinations like the Moon and Mars.

Research on the manned base is the only way to closely study the effects of long duration space travel on humans, and to develop strategies for ensuring the well-being of our astronauts on future missions. When the decision to undertake such a mission is made, the manned base can be converted to become the staging area for assembling the required transportation system.

b: The Space Station's benefits to individual Americans are a continuation of benefits that have been reaped from the U.S. space program. Some of these benefits are intangible but important, such as pride in our nation's accomplishments and leadership in space, increased scientific understanding of our world and the universe, and the thrill of exploring one of the few remaining frontiers.

But there are also more tangible benefits. Technologies advanced by the space program in areas like electronics, materials, and medicine have led to important new business and consumer products, ranging from personal computers to health monitoring equipment for hospitals. The Space Station will continue this process through research and technology development in important areas like materials science, life sciences, and robotics. Substantial new business opportunities will be created in the years ahead, by direct applications of the Space Station as well as by terrestrial spin-offs.

Other benefits are distributed in their impact and affect most Americans more indirectly. Advances from Space Station research and development activities will strengthen the U.S. technology base and economy. Improved understanding of global environmental problems is of universal benefit, for it will help prevent deterioration of the quality of life on Earth. Last, the U.S. position as the world leader in civil space has been an important factor in promoting a positive view of our nation abroad, and the high visibility of our Space Station program will continue this effect in the coming decades.

Question: What non-NASA entities are participating in the Space Station? Who are they, what are they contributing and what is the dollar value of each contribution?

Answer: NASA is the only U.S. agency currently involved in the Space Station development program, although we anticipate other USA users (such as NOAA) and non-USA users. We have signed agreements with Canada, Japan, and a consortium of eleven European nations under the aegis of the European Space Agency, governing their participation in the program. Our international partners will provide approximately $7-8 billion of hardware to Space Station Freedom, allowing a vastly more productive facility. They also will be responsible for the operations costs of their hardware and will pay a share of the common operations costs over the lifetime of the station. Cost estimates for the partners' investment in development and early operations:

Country	Element	Estimated Value*
ESA	Columbus program - Attached pressurized module - European polar platform - Man-tended Free Flyer	$4.8 billion
Japan	Japanese Experiment Module	2.2 billion
Canada	Mobile Servicing System	1.0 billion

* At current exchange rates

Question: If you were given your budget request but told to stretch out the Space Station and use immediately-saved funds for other purposes, what would your other priorities be?

Answer: The NASA request before the Congress represents a well thought-out program with a balanced set of priorities. To add monies to other programs and projects at the expense of the Space Station Freedom program would be very disruptive and not in consonance with effective planning.

Space Science

Question: How does NASA set priorities among shuttle, Space Station and space science programs?

Answer: NASA's budget process covers review of all on-going programs and projects with the attendant assessment of current resource requirements and status and assessment of the technical readiness of the potential new initiatives together with the institutional and programmatic requirements to execute that balanced set of objectives. Before the budget is submitted to Congress each year, the NASA Administrator along with the Administration ensure that the most pressing needs in all areas of the program are met and a balanced space program is provided.

Question: Were any space science programs eliminated or reduced by OMB?

Answer: The Earth Probes program was deferred by OMB from the FY 1990 budget as a potential new start due to funding constraints. The program is being considered again for the FY 1991 budget as a potential new start.

The Gravity Probe B (GP-B) program was a potential new start according to the Space Science and Applications Strategic Plan in the 1993-1994 time frame, at the earliest. The program that was deleted from the budget was the Shuttle Test of Relativity Experiment (STORE), an advanced technology development program which must precede GP-B. The deletion of STORE in FY 1990 was a direct result of the $25 million reduction to the Office of Space Science and Applications' (OSSA) budget necessitated by an OMB reduction to NASA. Following the decision rules outlined in the

OSSA Strategic Plan, and given STORE's relatively high FY 1990 cost compared to the likelihood of a GP-B new start in the mid-1990s, STORE had a lower priority compared to other ongoing activities.

The ACTS funding was deleted by OMB from the NASA budget as it has been in previous years, according to a long-standing policy of the Administration to move commercially relevant technology to the private sector.

The funding request for CRAF-Cassini, the Office of Space Science and Application's FY 1990 new start designed to explore Saturn, its moons, and a comet, was reduced by $10 million in FY 1990.

Finally, the Scout CRRES program, a low technical and financial risk program to study the effects of radiation, was also eliminated.

Question: What space science programs are you considering that are currently unbudgeted?

Answer: The Office of Space Science and Applications Strategic Plan provides the framework within which missions are planned through the end of this century. The Strategic Plan is comprised of five program themes, each of which contains a number of proposed missions. The attached matrix for the current OSSA Strategic Plan identifies space science programs under consideration through 1995.

Technology Transfer

Question: Technology transfer is currently being promoted as a means of making U.S. industry more competitive internationally and of improving the U.S. trade imbalance.

a. What will your principal technology transfer activities be?

b. Will industrial applications centers continue to be operated with the current or better levels of service?

Answer: NASA's principal technology transfer activities will continue to include those which have been developed over many years and have proven successful in providing U.S. industry ready access to new advancements in science and engineering resulting from NASA research and development programs. These activities include:

- o NASA Tech Briefs - a monthly periodical that now reaches over 160,000 industrial readers nationwide. It is estimated that the number of industrial subscribers to this popular technical journal will top 200,000 by Spring 1990.
- o Industrial Applications Center (IAC) Network - The ten (10) NASA IAC's now provide information and technology transfer services to U.S. industrial companies nationwide, having expanded through affiliate relationships with State-sponsored and university-based industry technical assistance centers in

40 of the States.

- o NASA Computer Software Center - The Computer Software Management and Information Center (COSMIC), established by NASA at the University of Georgia, sells/leases reusable NASA-developed software to U.S. industry.
- o Applications Teams - Multidisciplinary teams of scientists and engineers who work with private and public sector institutions to identify problems of national scope and significance that may be addressed using existing aerospace technology.
- o Applications Engineering Projects - Jointly funded projects between NASA, user agencies and industrial partners to adapt or reengineer available NASA technology to specific problems in industry and the public sector.
- o Patent Licensing Program - Reporting and Licensing of inventions made under NASA contract or in-house research for dissemination to interested industrial users.

Each of the above technology transfer activities spawn opportunities for direct interaction with industry through Cooperative Research and Development Agreements (CRDA) which have been authorized under the Technology Transfer Act of 1986. The number of such agreements are expected to increase significantly as a result of the opportunities developed through NASA's established technology transfer system. Accordingly, four enhanced program initiatives are being vigorously pursued with respect to technology transfer and the enhancement of cooperative endeavors:

- o Strengthening NASA's technology/transfer infrastructure, and coordination throughout the agency.
- o Expanding efforts on the identification, reporting, and evaluation of new technology.
- o Aggressively promoting cooperative research and development agreements for technology transfer purposes.
- o Promoting cooperative efforts with state-based organizations for economic development through technology transfer.

Information and technology transfer services provided to U.S. industry by NASA's Industrial Applications Center network can improve significantly, provided that sufficient resources are available to expand and upgrade computer equipment and linkages with the IAC Affiliates located throughout the nation regionally. Modest improvements are planned for the Industrial Applications Centers during FY 1990. However, assuming an augmented budget, such enhanced computer systems will not be fully available for IAC use until the FY 1991 timeframe at the earliest.

Question: How do you prioritize internally technology transfer programs?

Answer: Historically, technology transfer programs within NASA were given modest priority when compared to NASA research and development activities. However, these efforts are realizing a higher degree of emphasis and importance in recent time as a result of recent Congressional legislation and a broader recognition of technology transfer throughout the Federal government as an effective means to increase industrial productivity and competitiveness on a worldwide basis.

Question: The National Institute of Standards and Technology will be pursuing some technology transfer activities as apparently will the Strategic Defense Initiative (SDI) office. How do you see your efforts vis-a-vis those of these other entities or other departments/agencies of government?

Answer: We, at NASA, recognize that we are but one of many contributing organizations that can help foster technology transfer of R&D innovations to U.S. industry on a nationwide basis. Government agencies at all levels--Federal, State and local--should work cooperatively to continue to build and provide the necessary infrastructure support for a nationwide network for industrial and economic progress through technology transfer. As already stated, NASA has been instrumental in the development and evolution of a nationwide network to provide access to new and useful technologies by U.S. industry. We intend to continue to do our part to enhance this basic technology delivery system, but welcome the support of NIST, SDI, or any other agency to continue to enhance these efforts cooperatively. Moreover, NASA feels that all Federal agencies -- having a mission or mandate to transfer technology -- should assure that our respective technological resources and new advancements in science and engineering are identified, packaged in a useful form, and made readily accessible by industry through whatever effective delivery mechanisms exist.

Question: Do you see any change in either the quality or quantity of spin-offs from NASA programs over the years?

Answer: While NASA cannot provide a definitive answer to this question, as it is dependent, to a large extent, on appropriately funded research and development programs, there does appear to be a significant increase in technology transfer activity and opportunities for bonafide spin-off from NASA R&D programs in the past several years. Much of this is attributable to increased awareness by industry of the potential which such advanced technologies have in the commercial world, as well as some discernible, qualitative change in NASA-developed technologies. American companies appear increasingly motivated in recent time (perhaps as a result of foreign competition) to investigate externally-generated technologies more now than ever before. Additionally, NASA senses a renewed commitment by many firms to stay competitive. This translates into a more aggressive stance being taken by U.S. firms to invest in the application of new technological advances (derived from NASA's R&D efforts) for commercial purposes. Whether this overall increase in technology transfer activity will result in concomitant increases in the quality and/or quantity of resultant spin-offs of NASA technology, still remains to be seen. NASA will exert every reasonable effort to assure that such increases will occur.

QUESTIONS SUBMITTED BY SENATOR WYCHE FOWLER, JR.

CRAF/Cassini Program

Question: Could you present the rationale behind the CRAF-Cassini new start? What are the anticipated scientific benefits? How do you weigh the cost-effectiveness of the combined missions? What about the international cooperation issue; in particular what level of commitment have the Europeans made to the two missions? What would be the consequences of another delay in initiating a new start for the CRAF-Cassini mission, in terms of mission schedule, impact on the science teams, financial cost, and effect on the European commitments to the projects?

At this point, I would like to request that the colloquy I held with Sen. Riegle in support of CRAF/Cassini during the Senate's consideration of the FY 1989 NASA Authorization be inserted in the hearing record.

Answer: The outer solar system and primitive solar system bodies, such as comets and asteroids, uniquely preserve the archaeological record of the formation and evolution of our solar system. The Comet Rendezvous Asteroid Flyby (CRAF)-Cassini mission will address two fundamental science questions: the origin of the solar system and the origin of life. The program is designed to help determine whether the solar system is the natural result of star formation, and whether the appearance of life is a natural part of the early evolution of planets that are like our Earth.

The mission consists of two parts. The first part, CRAF, will take a sustained, close-up look at one of the most primitive bodies of the solar system: a comet. Comets are thought to have formed in the outer reaches of the early solar system where they are relatively unaffected by the Sun's heat and radiation, and may therefore contain samples of the primitive matter from which the solar system was made. Comets are largely water-ice, and are rich in organic material. CRAF will address some of the following key science questions about our Earth and solar system:

- Was this organic material part of the solar nebula?
- Did it come from interstellar clouds?
- Did this organic matter play a role in the origin of life on Earth?
- How did the planets form from planetesimals?
- Are Earth's oceans melted comet ice?

The second part of the mission, Cassini, will provide an in-depth look at Saturn and its enigmatic moon, Titan. Titan's atmosphere is primarily nitrogen with elements of methane and other carbon bearing compounds. Titan may even have an ocean of methane and methane on its surface. Non-biological processes in Titan's upper atmosphere produce complex organic molecules from these simple carbon compounds. The Cassini probe into Titan's atmosphere will address these important science questions:

- Could similar processes on the early Earth have produced the organic material that was needed to start life here?

- o Where did Titan's atmosphere come from?
- o Does it really have an ocean?

Recent research suggests that Earth's early atmosphere may have been inhospitable to the evolution of organic material and that the necessary complex, prebiotic molecules may have been delivered to Earth from the outer solar system by comets and asteroids. An alternative theory proposes that the primitive terrestrial atmosphere may have been similar to Titan's present atmosphere. Thus, clues to understanding the origin of life on Earth may lie in the investigation of both the organic material frozen in comets and the synthesis of present-day organic compounds in Titan's atmosphere.

NASA's internal consideration of this initiative places great emphasis on cost-effectiveness, and development of the program under a single project structure creates significant savings. While the combined and stand-alone costs are approximately the same in the first two years, a combined effort saves an estimated $500 million over the development life of the Program. These savings occur as a result of having a common Project Management Team, a common Mission Operations Team plus common development, and a common Spacecraft Design Team plus common development, and a greatly reduced set of engineering spare equipment required for each launch. Each mission, if pursued individually, would cost over $1 billion each, while the joint program has an estimated total development cost of $1.6 billion. There are also large savings in the operations phase of the combined program.

The European Space Agency (ESA), the Federal Republic of Germany (FRG) and foreign space science communities are strongly committed to the CRAF-Cassini Program. ESA has selected the Cassini Titan Probe, which they have named Huygens, as their next science program, and budgeted over $200 million ($3.6 million has already been invested). The ESA commitment is, however, conditional upon U.S. approval for an FY 1990 new start. The anticipated funding for ESA member states' science instruments is over $60 million.

The Federal Republic of Germany will provide the propulsion module subsystem for the Mariner Mark II CRAF mission, a $75 million investment ($11.6 million has already been invested). Finally, it should be noted that ESA turned down an opportunity for partnership on the Soviet VESTA program and an all-European mission in order to work with the U.S. on CRAF-Cassini. The ESA commitment letter to the Cassini Titan Probe went on to state that if NASA did not start the CRAF-Cassini mission in FY 1990 they would re-open the competition to choose another ESA candidate.

An FY 1990 new start is crucial to the success of the CRAF-Cassini Program because the Program is dependent upon perishable launch opportunities. For a 3-year period in the mid-1990's, a planetary alignment similar to that which enabled the Voyager Grand Tour will be available; this will make possible a trip to Saturn with an economical flight time. If this opportunity is missed, the lack of a Jupiter gravity assist will be very detrimental to the Cassini mission. Additionally, to achieve sufficient energy for the CRAF spacecraft to rendezvous with one of the candidate cometary targets, our current launch capability dictates the need for gravity assist trajectories. Whether a single flyby of Earth or multiple flybys of Venus and Earth are employed, the phasing of these bodies with each of the candidate comets determines when launch opportunities exist.

In order to rendezvous with the baseline Comet Kopff in 2000, CRAF must launch in August 1995. Two backup launch opportunities exist in 1996 to another good target, Comet Wild 2. After the CRAF 1996 backups, launch opportunities for CRAF deteriorate dramatically: cruise times for the 1997 launch opportunities are three to four years longer than that for the baseline (with comet arrivals in 2005 or 2006), and no launch opportunities exist in 1998. Cassini's last launch opportunity with a Jupiter gravity assist is May 1997, with the optimal launch being April 1996. For launches later than the 1996 baseline, Cassini requires an additional year or more to reach Saturn. The cost to the spacecraft design for backups beyond those described will be higher due to additional thermal design rework needed for Venus flyby trajectories.

In order to have enough development time to meet the baseline launch opportunities, development (i.e., the new start) must begin in FY 1990.

Space Station

Question: What are the assumptions you are making about launch capability in your current cost and schedule projections for the space station? What are your contingency plans if those assumptions are not realized?

Answer: Space Station Freedom program assembly and operations planning is designed for the existing Space Shuttle transportation capability. It assumes a total Shuttle flight rate of 14 per year. The current baseline utilizes 20 flights over 3 years to complete station assembly, and five flights per year are subsequently dedicated to space station operations. Marginal Shuttle costs are used in cost projections. In the area of contingency plans, NASA is studying the potential use of expendable launch vehicles to meet some program requirements.

Long Range Budget Plans

Question: I'd like to discuss your longer range budget planning. The May 1988 CBO report titled The NASA Program in the 1990s and Beyond found that expanding and operating the low-earth-orbit infrastructure program may well consume over 70 percent of the NASA budget in the 1990s. Where do you see the program headed over the next 10 years or so? In an era of overall fiscal austerity, how do you plan for balancing the needs for transportation and physical infrastructure, maintenance of the human research base, new mission starts, and basic technology development? For instance, do you think the goal of providing one fifth of the NASA budget for space science and applications will prove feasible in the coming decade? What about the National Academy of Science's call for 7 percent of the budget to be devoted to Space Research and Technology? What should our priorities be as lawmakers in order to give us the best space program at whatever dollar figure the budget process will support?

Answer: The Space Station Freedom will be the corner stone of the NASA program over the next ten years. It will provide our first opportunity to gain direct experience in long term human operations in space, and knowledge essential to future space exploration. It will enhance the US space science programs, further the commercial utilization of space, and stimulate the development and application of advanced technologies of national importance. It is also an avenue of cooperation with our allies, demonstrating the peaceful use of space for the benefit of all. To build this capability will require a long range commitment on the part of both the Administration and Congress. Although the FY 1990 budget was developed during overall tight fiscal constraints, it represents a balanced space program that is solid, productive and exciting. It clearly demonstrates the Administration's commitment to the civil space program, and particularly the Space Station.

NASA's commitment to a general guideline of Science and Application at the 20% level continues and I feel it will be feasible in the coming decade. However, fixed percentages are not the goal, a productive and balanced program which meets carefully laid out and agreed to objectives in a timely manner is expected to require approximate levels of funding. Each program and project has a funding profile that attempts to meet those goals in the most effective manner and that will require differing amounts in any one year. Balancing the programs requires careful review of the status of each project and judgments concerning its progress and contributions toward the goals and objectives of the Science and Applications programs.

In the area of Space Research and Technology, serious consideration is given to the recommendations of the National Academy of Science as well as other advisors. We recognize the need for strengthening our activities in this area and our FY 1990 budget includes an increase in Research and Development funding of more than 50% above the FY 1988 level. In addition, our civil service manpower devoted to this area has been increased and is about 9% of the total. We will continue to evaluate progress, as well as the needs and opportunities as we move forward in this area.

In our judgment the President's budget request reflects the appropriate priorities. The President stressed the importance of investment in the future in science, space and technology. Within the Space Program priority is given to successful operation of the Space Shuttle, to moving ahead with Space Station Freedom and to continuing a strong program of science and applications. Essentially all of the budget request is devoted to accomplishment of programs and projects already approved by the Congress with only a very modest commitment to new initiatives. NASA is very appreciative of the support Congress has shown to keep the civil space program, and particularly the Space Station on track. Today, more than ever, we need the support of the Congress and urge you to support the Administration's priorities by recommending funding for NASA programs as close as possible to the President's budget request.

Question: Dr. Fisk, please describe the rationale behind the strategic plan which you have developed in the Office of Space Science and Applications. How does it relate to NASA's overall budgetary planning? Will its program be enough to sustain U.S. leadership in space science, and to provide the opportunities to encourage the next generation of American space scientists?

Answer: The Office of Space Science and Applications' (OSSA) Strategic Plan provides a flexible process that outlines the basis for near-term decisions on the allocation of resources and the planning of future efforts. Based on the strategies that have been developed by the advisory committees both of the National Academy of Sciences and of NASA, the Plan provides for the completion of the ongoing program, balances major, moderate, and small mission initiatives, the utilization of Space Station Freedom, and the requirements for a vital research base.

The outcome of this process is a clear, coherent strategy that meets both NASA's and OSSA's goals, that assures realism in long-range planning and advanced technology development, and that provides sufficient resiliency to respond and adapt to both known and unexpected internal and external realities. As was the case in FY 1989, the Plan was the basis for the OSSA portion of NASA's FY 1990 budget submission.

The Strategic Plan provides other offices within NASA a clear indication of future OSSA requirements, which will contribute to the program planning and budgeting of those offices. Specifically, the Plan discusses the employment of OSSA strategy and long-range programming in regard to the needs for transportation (launch vehicles), in-orbit infrastructure (Spacelab and Space Station utilization), communications and data management, advanced technology, and institutional resources.

Overarching Agency initiatives, such as geostationary platforms as part of the Mission to Planet Earth concept and/or Mars Rover/Sample Return, are not considered in the base strategy. When such initiatives are approved, the appropriate resources must be added over and above the baseline.

The Plan specifically addresses the issues of U.S. leadership and support for the next generation of space scientists. The "Principles" found in the Strategic Plan include:

o Constant emphasis on excellence and the maintenance of U.S. scientific leadership

o Basic scientific goals and strategies defined by the scientific community

o Strong support for universities to provide essential long-term research talents

The Strategic Plan is designed to meet the challenge of sustaining in the future the unprecedented levels of space science activity begun this year. OSSA wants to begin now to ensure that the excitement of the next few years continues through the end of this century and into the next.

Question: Dr. Fisk, please describe the current state of the space science research community in the United States. Is your research and analysis budget adequate to maintain a strong research base in our colleges and universities, as well as at the NASA centers?

Answer: The current state of the U.S. space science research community is a great concern of mine. Underlying the Office of Space Science and Applications (OSSA) Strategic Plan is the need for a trained and experienced academic community to analyze the vast amounts of space science data that will become available in the next few years with the launch a number of Space Science and Applications missions. The science community may find itself inadequately prepared, both in technical capability and number of personnel, to deal with this onslaught of data.

The personnel issue is particularly critical due to the projected decrease in science, mathematics, and engineering students of the next decade. Two facts may contribute to a serious shortage of qualified scientists and engineers in space science: (1) many early participants are now nearing retirement age, and (2) diminished space science activities in the late 1970s and early 1980s discouraged new researchers from entering the field. These factors, combined with increased data, strongly stress the need for maintaining and increasing support for graduate students and post-doctoral researchers.

In order to help stem this tide and meet the larger demands of the future, OSSA supports a number of programs designed to stimulate and reinforce university participation: the JOVE program, the Life Sciences SCOR program, and the Graduate Student Researchers Program (GSRP).

OSSA and NASA's Marshall Space Flight Center have initiated a Joint University Venture (JOVE) with the university community to promote education in the fields of science and engineering. The JOVE initiative grew out of the realization that the upcoming observatory missions would make a great deal of space science data available for analysis. This data resource can be used to broaden the participation of university scientists in the space program, and at the same time spread the excitement of the space program to many more students at the universities as well as the secondary and elementary school level. The program addresses our national concern of continually attracting young and brilliant minds to space science and engineering.

The Specialized Centers of Research (SCOR) program will provide block grants to selected universities as a mechanism for actively involving the university community in the coordination of interdisciplinary research on focused themes to optimize scientific returns. This program will also help promote the development of the next generation of space science researchers. The Life Science SCOR program was modeled after a similar, successful National Institutes of Health (NIH) program, in which all NIH institutions participate.

The GSRP awards fellowships to promising U.S. graduate students whose research interests are compatible with NASA's programs in space science and aerospace technology. Each year approximately 80 new awardees are selected for participation, based on competitive evaluation of their academic qualifications and their proposed research plan.

In addition to these academically oriented programs, OSSA also employs its Suborbital and Small Explorer program to involve potential future space scientists and engineers. These programs offer projects such as the Stratospheric Observatory for Infrared Astronomy (SOFIA) and various sounding rocket and balloon activities that create substantial opportunities for students to participate in the development and use of experimental hardware. These programs have the additional advantage of a relatively short design and development periods, so that a student that worked on the development of a project may also be involved in the postflight data analysis.

Finally, with the requested FY 1990 augmentation to the mission operations and research and analysis budgets, there will be adequate funding to maintain a strong research base. This augmentation will enable us to conduct better and more detailed research in the areas of Astrophysics, Earth Science and Applications, Space Physics, Planetary Exploration, and Life Sciences. An augmented research base budget will ensure that the U.S. space science program is second to none.

Historic Preservation Issues

Question: In addition to being a supporter of our space program, I am also very interested in historic preservation issues. I am told that NASA has 20 facilities which are classified as national historic landmarks, the highest level of recognition of historic significance afforded by the United States. I am told one of these is the mission control rooms at the Johnson Space Center in Houston. I understand that until early April, discussions were underway between the Johnson Space Center and the Texas State Historic Preservation officer on ways to preserve at least one Apollo-era control room within your plans for modernization and modifications to support the Shuttle and Space Station programs. I think we all would agree that the Apollo program is a crucial part of the history of the United States, and I would hope that something can be worked out to allow for the preservation of an Apollo control room. Could you give us a report on how this matter now stands?

Answer: See the enclosed letter.

LETTER FROM RICHARD H. TRULY, ACTING ADMINISTRATOR, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

JUN 21 1989

Honorable Lloyd Bentsen
United States Senate
Washington, DC 20510

Dear Senator Bentsen:

Thank you for your recent letter regarding planned modifications to the Mission Control Center (MCC) at NASA's Johnson Space Center and its historical significance.

We share fully your concerns and those of the National Park Service and historic preservation societies that all feasible alternatives be explored for preserving as a national historic landmark the facility from which the world's first manned lunar landing missions were controlled. I believe that through the cooperation of NASA, the National Park Service and Congress, as well as the State of Texas and other interested groups, we can preserve for future generations the historic essence of the Mission Operations Control Room. However, we are also responsible to the Nation to operate this control center for present and future space programs. We cannot fulfill this responsibility unless we continue the practice that has existed since the inception of Mission Control of modifying and improving the facility to meet changing mission needs and to incorporate vital new technologies.

In striking an appropriate balance between preserving our history and maintaining a strong, competitive American space program, we must recognize that even before the Apollo program ended we had begun modifying the control center to meet changing mission demands and to take advantage of improved technology. Since the historic Apollo 11 mission and before the facility was designated a National Historic Landmark on December 24, 1985, every console in the Control Center had been removed, stripped of all components, and rebuilt. Vacuum-tube electronics were replaced with solid-state, computers were changed out, rear screen projection systems were replaced, support room walls were moved, and control room color schemes (walls, carpets, and consoles) were changed from green to brown. Console layouts and operator positions have changed continuously, almost on a mission-by-mission basis, since 1964 when the Houston facility was first used to control the historic Gemini 4 flight, which included the first spacewalk by an American astronaut.

Despite all these changes, the awesome sense of history that draws more than a million visitors a year to the Houston Center has not been diminished. In fact, it has been enhanced by the visitor's realization that momentous events have been and continue to be directed from Mission Control. Changes to Mission Control actually became part of its heritage and contribute to maintaining it as a living institution. Only relics and dead institutions can be preserved in some final architectural and functional state, and I'm sure all would agree that Mission Control is far more important to the Nation and to Texas as a living historic institution.

The continuing process of changing and updating Mission Control is vital to present and future Space Shuttle operations and to the eventual support of Space Station Freedom. The contemplated changes will inevitably lead to a facility with internal features that are different in function and appearance from the original Apollo design. Although changes occur, the facility will retain its identity and will be readily recognizable, inside and out, as having evolved from the original Apollo design.

Again, we recognize and share your concern and desire that the heritage of Apollo be preserved as fully and reasonably as possible. To this end we have maintained a complete photographic record of the Apollo control room structure, utilities, configuration, flight control systems, control consoles, and visual displays. Further, we are retaining original equipment such as console shells and display panels, as they are replaced by newer equipment so it will be possible to replicate the original room.

Since the Mission Control Center operates as an integrated whole facility with common support areas, it would not be possible to isolate the former Apollo flight control room and remove it from service without substantially duplicating its functions by constructing a further addition to the Mission Control Center. The cost to do this would be prohibitive for NASA.

We agree that the Johnson Space Center is the appropriate location for a replica of the Apollo control room. Replication with private funds through efforts of the Texas State Historical Preservation Office is one viable option. Another replication concept which we will explore is to include it in Phase II of the recently planned, privately funded Space Center Houston public visitor center scheduled to open in 1991.

I am enclosing a detailed account of proposed changes to the Mission Control Center, and will be happy to provide any information you desire.

Please let me know if I can be of further assistance.

Sincerely,

Richard H. Truly
Acting Administrator

Enclosure

LETTER FROM K.B. GILBREATH, DIRECTOR, CENTER OPERATIONS, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

JD2/89-25 MAY 10 1989

Mr. Curtis Tunnell, Executive Director
State Historical Preservation Officer
Texas Historical Commission
P. O. Box 12276
Austin, TX 78711

Dear Mr. Tunnell:

The purpose of this letter is to continue NASA efforts to afford your office and the Advisory Council on Historic Preservation a reasonable opportunity to comment on planned modifications concerning the Mission Control Center (MCC), a designated historic landmark at the Lyndon B. Johnson Space Center (JSC), Houston, Texas, and thereby complete the Section 106 process. As you know, the essence of our situation is that the MCC is operational and the National Aeronautics and Space Administration (NASA) has a continuing need to use the MCC as an essential facility in our space flight operations. Members of your office made their first of several visits to JSC on June 11, 1987, and have been involved in discussions with us during the ensuing period of time. In keeping with 36 CFR 800.3(b), you were advised during your inspection visits of JSC's planned modifications to the building housing the MCC and to the MCC equipment. You were also informed that the modifications were absolutely essential to satisfy the operational flight control requirements for the Space Shuttle flights manifested through the 1990's.

It is imperative that our Section 106 consultation efforts be finalized. Enclosed are documents (submitted under 36 CFR 800.5) formally notifying you and the Council of the MCC modifications necessitated by the manifested Space Shuttle flights. Enclosure 1 is titled, "Notice of Finding of No Effect, Construction of Addition to Mission Control Center (MCC)." Enclosure 2 is titled, "Notice of Finding of Adverse Effect, Equipment Upgrade to Mission Control Center (MCC)."

The SHPO and the Council are requested to review this NASA action. Please give us a written response within the appropriate timeframes.

Sincerely,

Original Signed By
K. B. GILBREATH

K. B. Gilbreath
Director, Center Operations

2 Enclosures

cc:
Advisory Council on Historic Preservation
The Old Post Office Building
1100 Pennsylvania Avenue., N.W., #809
Washington, DC 20004

NASA Headquarters, NXG/J. Bayne
Washington, DC 20546

NOTICE OF FINDING OF NO EFFECT
'Construction of Addition to Mission Control Center (MCC)'

The National Aeronautics and Space Administration (NASA) has determined that the proposed 'Construction of Addition to Mission Control Center,' described below, does not affect the integrity of the MCC. This conclusion was reached since the historic character of the MCC is not altered by the addition of a Space Station Freedom Support Center. This construction does not make any physical change to the MCC, other than an addition that follows the original design of the MCC. In addition, the face of the building is not changed and, as a result, the public's perception of the MCC remains intact.

This is your notice, under 36 CFR 800.5(b), that NASA has determined the construction of the addition to the MCC has no effect on the historical significance of the MCC.

CONSTRUCTION OF ADDITION TO MISSION CONTROL CENTER
LYNDON B. JOHNSON SPACE CENTER
HOUSTON, TEXAS

SUMMARY

This project provides for construction of an addition to the existing Mission Control Center (MCC), building 30 Mission Operations Wing (MOW), to meet the requirements for continuing on-orbit operations support for Space Station. This five-story addition Space Station Support Center (SSSC), comprising approximately 106,000 square feet (9,847 square meters), will provide required facility space to accommodate various ground-based automatic data processing (ADP) equipment systems and associated operations support areas. Included in the work of this project is the installation of utilities, raised flooring, air-conditioning, fire-detection and suppression, power and lighting, a service drive and loading dock, walkways, and a parking area.

PROJECT JUSTIFICATION

This project is required to provide a facility for the initial and continuing basic ground support of the Space Station orbital assembly. Beginning with the first element launch, the facility will be required for support of real-time, near-real-time, and follow-on operations management, engineering analysis, contingency planning/operations, and logistics coordination/management for the life of the Space Station Program. The facility must be fully operational approximately 1 year prior to first element launch to support operations procedures simulation and verification. Systems installation, activation, and testing within the completed addition will require nearly 3 years of work prior to operational readiness.

The SSSC provided by this facility addition is required to meet program and Center responsibilities for Space Station operations. Location in the proximity of the existing Mission Control Center (MCC) is required for sharing of common skills, personnel, equipment, communications, and data between the similar operations, engineering, and maintenance tasks for the Space Transportation System (STS) and Space Station programs. The new facilities of this project are required because all existing and planned facilities will be fully utilized during and beyond the initial Space Station operations period. The MCC will remain configured for, and dedicated to, the high levels of STS operations planned through the

1990's. Limited sharing of MCC areas will be possible; however, the STS mission flight rate, personnel and equipment distribution, limited floor space, and the extensive security restrictions of the MCC make it unsuitable and unavailable for use as the SSSC.

The facility addition of this project provides the operations and associated equipment areas required for the basic continuing operations support of the Space Station orbital assembly. Operations management, support, planning, evaluation, and simulation areas are included with utilization flexibility to meet critical, high-activity support periods, as well as efficiently accomplish the more common routine level of daily support. It is anticipated that up to 55 civil service and 190 contractor personnel on a prime shift will be required in the facility during routine Space Station operations; and yet, two and one-half times this number must be anticipated during anomalies and emergency operations. The facility will be used around the clock. In addition to the workstation-style operations areas, approximately 27,000 square feet (2,508 square meters) of the addition will be required for storage and peripherals; voice and video processing, recording, and archiving; data archiving and retrieval; timing control and display; and basic systems operation and maintenance. The addition also includes an area for management/visitor access and observation, as well as the usual facilities features of a permanent multistory building. Provisions have not been included for payload operations and active customer support.

If this project is not approved, there will not be adequate space at JSC to establish and operate the SSSC required for program accomplishment. All suitable existing facilities will remain fully utilized for STS operations. Systems installation/activation and operations procedures development and verification requirements prior to first element launch require this facility to be completed by mid-1991. Program operations schedules will be delayed by nonavailability of this facility.

DESIGN

Design for the Construction of Addition to Mission Control Center utilizes existing water and sanitary sewer and storm sewer lines to provide required service to the building. A paved access road and loading area permit utilization of a loading dock on the north side of the SSSC. The proposed parking addition on the west side of Second Street is designed to accommodate parking demand for the SSSC.

The architectural design of the SSSC has been, in part, dictated by the existing building 30 Mission Operations Wing (MOW). The primary objectives being realized through the design of the SSSC include providing the required physical security and flexible interior spaces to accommodate functional changes and new equipment in the future, maintaining the architectural integrity and image of the building 30 MOW, minimizing disruption of operations in the MOW during construction, and complying with governing building codes.

The SSSC is a five-story steel structure addition designed as an independent load supporting system from the existing building, with a mezzanine, at the southwest corner of the existing building 30 MOW. It therefore utilizes, to the greatest possible extent, the same exterior components and materials. Using similar exterior materials and massing strengths complements the overall facility image.

The exterior skin of the building is a precast exposed aggregate facing (PEAF) panel. These panels are suspended from the individual structural floor levels to better facilitate future panel replacement needs, if ever required. The exterior PEAF panels are backed up by a metal stud wall system with batt insulation. The roof system is currently designed to match other JSC buildings and utilizes rigid board insulation for thermal protection.

The finished floors in the SSSC have been aligned wherever possible with the existing MOW to allow for efficient horizontal circulation of personnel and equipment between the two facilities without resorting to the use of stairs and elevators. The bulk of the SSSC facility utilizes a raised-access floor system. Ceramic tile and carpet tiles are used in the restroom areas and entry lobby spaces, respectively. Carpet tiles are to be used in the operations and workstation areas, as well as the action center, conference rooms, and VIP viewing area.

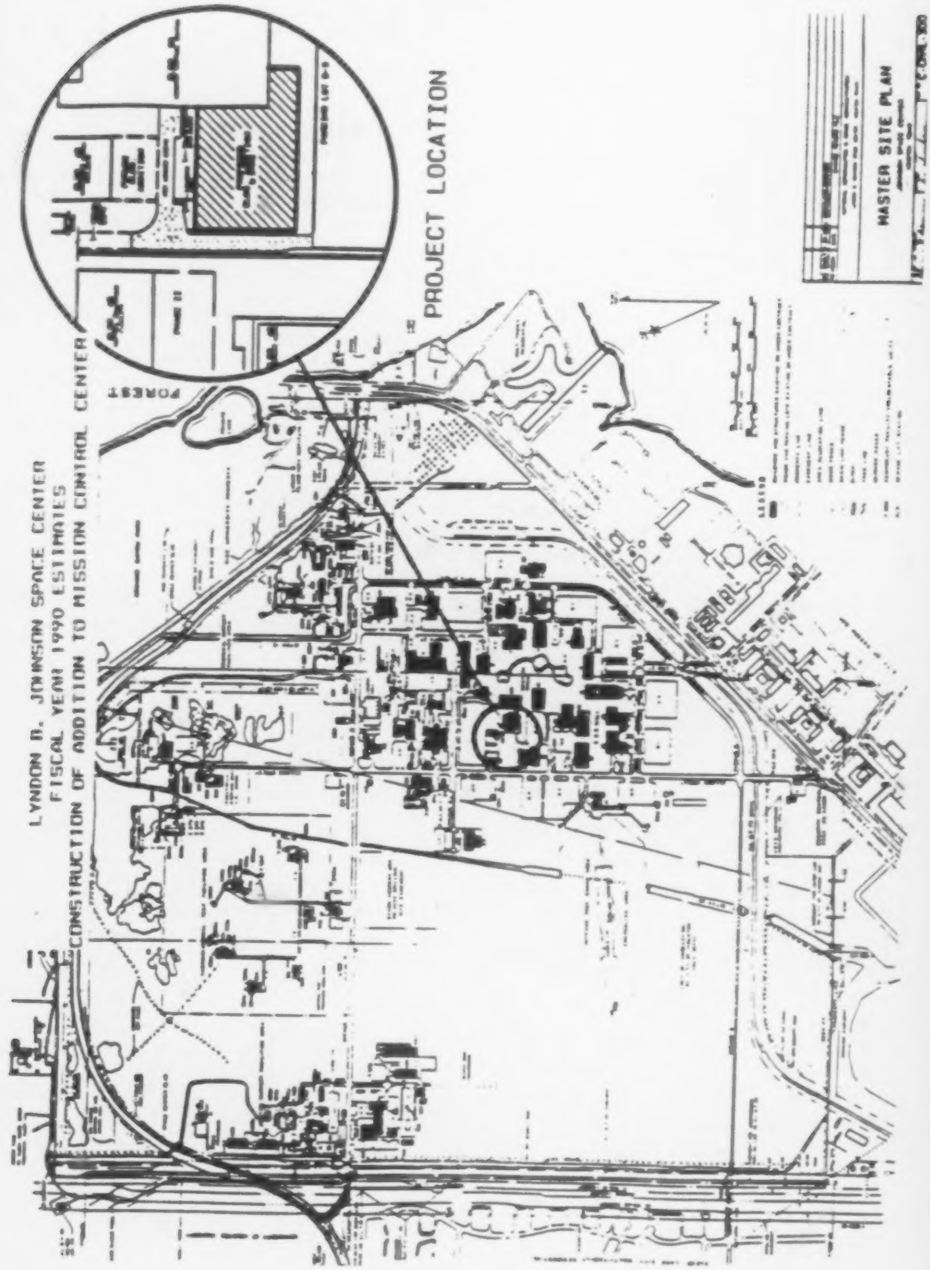
Interior full-height partitions within the SSSC are constructed of metal studs and gypsum board for the majority of the support areas. Their surfaces are to be finished with paint or vinyl fabric wall covering. Concrete masonry partitions, from structural floor to structural deck, are used to enclose stairs, elevator shafts, toilets, and mechanical and electrical rooms. Ceramic tile is to be applied to the interiors of the toilet areas.

In general, ceilings are a suspended 2-foot-by-4-foot acoustical lay-in system. Gypsum board ceilings are used in the restroom areas for moisture protection. The structure is exposed in all of the SSSC mechanical areas.

All personnel doors are of metal construction. Appropriate door hardware will be used throughout the facility. Doors are either stainless steel or are to receive a painted finish.

The interior surfaces of the SSSC are to receive a paint of the type and quality to provide durable and easily maintainable surfaces. All interior exposed concrete and masonry surfaces and interior drywall partitions and trim are to have a painted coating. Color selection is designed to brighten the overall facility environment.

Design of electrical systems includes extension of the primary distribution system; secondary power distribution within the building; lighting systems including emergency, egress, and exit lighting; and other electrical systems such as public address system, telephone system, detection and alarm systems, grounding systems, and lightning protection system.

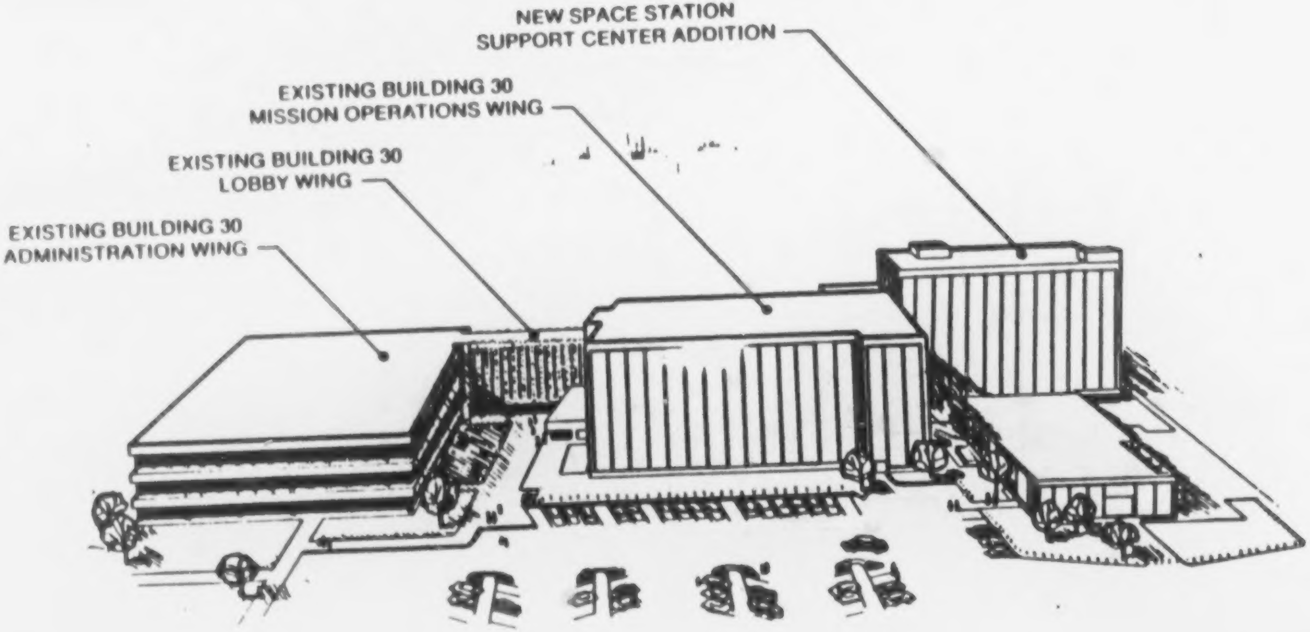


LYNDON B. JOHNSON SPACE CENTER
FISCAL YEAR 1990 ESTIMATES
CONSTRUCTION OF ADDITION TO MISSION CONTROL CENTER

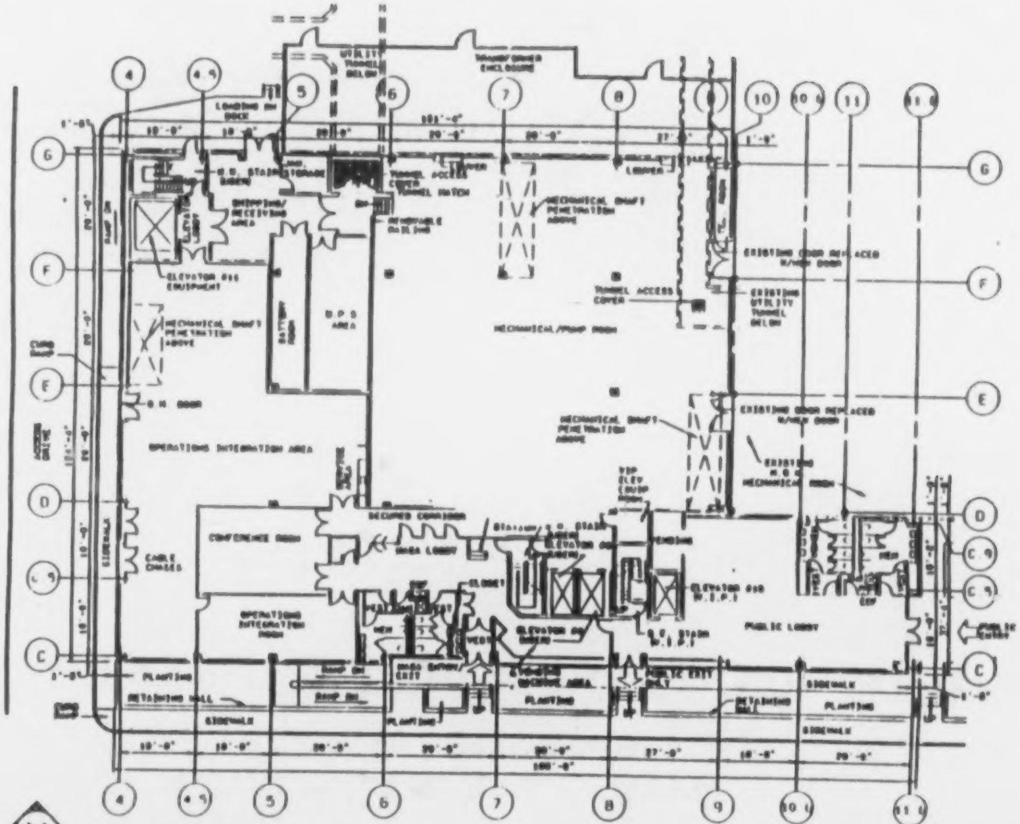
PROJECT LOCATION
FOREST
LEGEND
MASTER SITE PLAN

LYNDON B. JOHNSON SPACE CENTER
FISCAL YEAR 1990 ESTIMATES

CONSTRUCTION OF ADDITION TO MISSION CONTROL CENTER

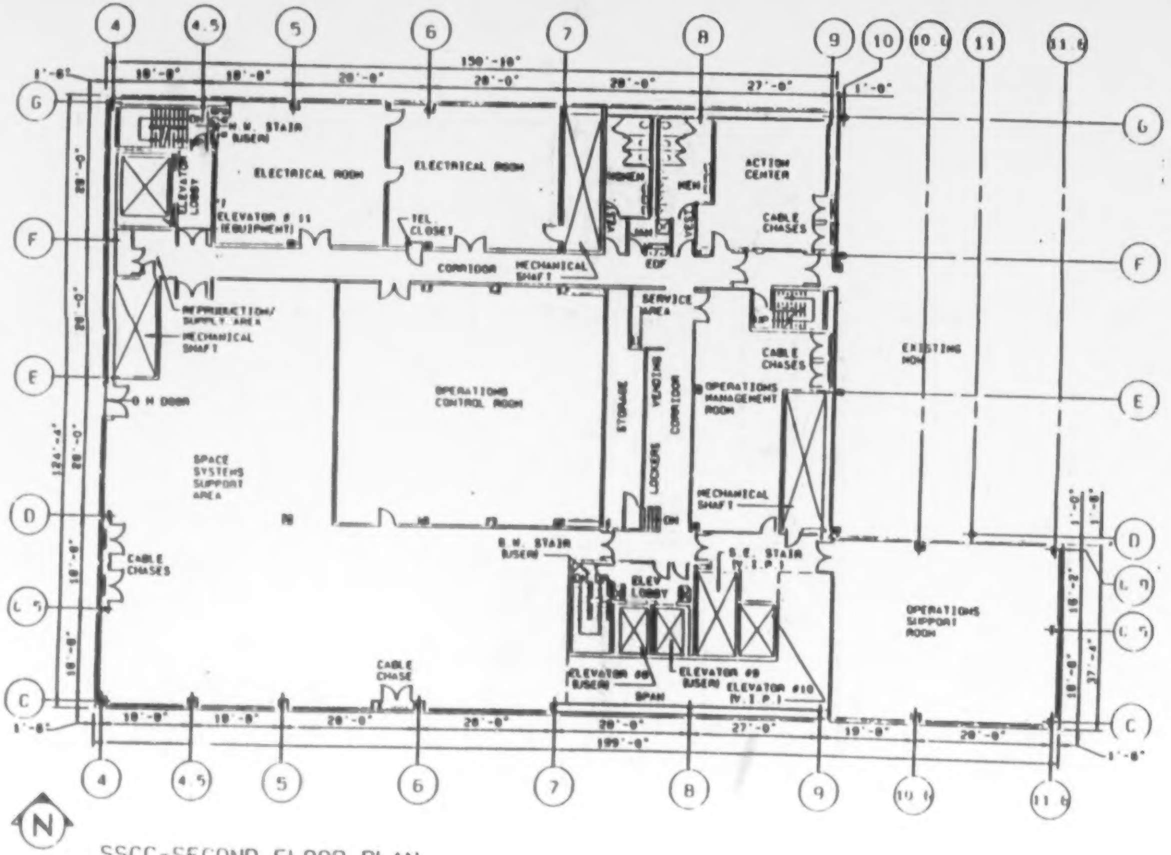

NEW SPACE STATION SUPPORT CENTER ADDITION
EXISTING BUILDING 30 MISSION OPERATIONS WING
EXISTING BUILDING 30 LOBBY WING
EXISTING BUILDING 30 ADMINISTRATION WING

SPACE STATION CONTROL CENTER


UTILITY TUNNEL BELOW
TRANSFORMER ENCLOSURE
LOADING DOCK
SHIPPING/ RECEIVING AREA
TUNNEL ACCESS COVER
TUNNEL HATCH
REMOVABLE GRILLE
LOUVER
MECHANICAL SHAFT PENETRATION ABOVE
ELEVATOR EQUIPMENT
BATTERY ROOM
U.P.S AREA
MECHANICAL/PUMP ROOM
TUNNEL ACCESS COVER
EXISTING DOOR REPLACED W/NEW DOOR
EXISTING UTILITY TUNNEL BELOW
EXISTING DOOR REPLACED W/NEW DOOR
EXISTING M.O.C. MECHANICAL ROOM
O.H. DOOR
OPERATIONS INTEGRATION AREA
CURB RAMP
SIDEWALK
CABLE CHASES
CONFERENCE ROOM
OPERATIONS INTEGRATION ROOM
SECURED CORRIDOR
LOBBY
CLOSET
MEN
VEST
ELEVATOR
VENDING
ELEVATOR W.I.P.I
PUBLIC LOBBY
PUBLIC ENTRY
PUBLIC EXIT
MEN
PLANTING
RETAINING WALL
SIDEWALK
RAMP DN
PLANTING
SIDEWALK
1'-0"
10'-0"
10'-0"
20'-0"
20'-0"
20'-0"
27'-0"
1'-0"
101'-0"
20'-0"
20'-0"
10'-0"
10'-0"
20'-0"
20'-0"
20'-0"
27'-0"
10'-0"
20'-0"
180'-0"
4
4.5
5
6
7
8
9
10
10.5
11
11.5
G
F
E
D
C.9
C.5
C
N

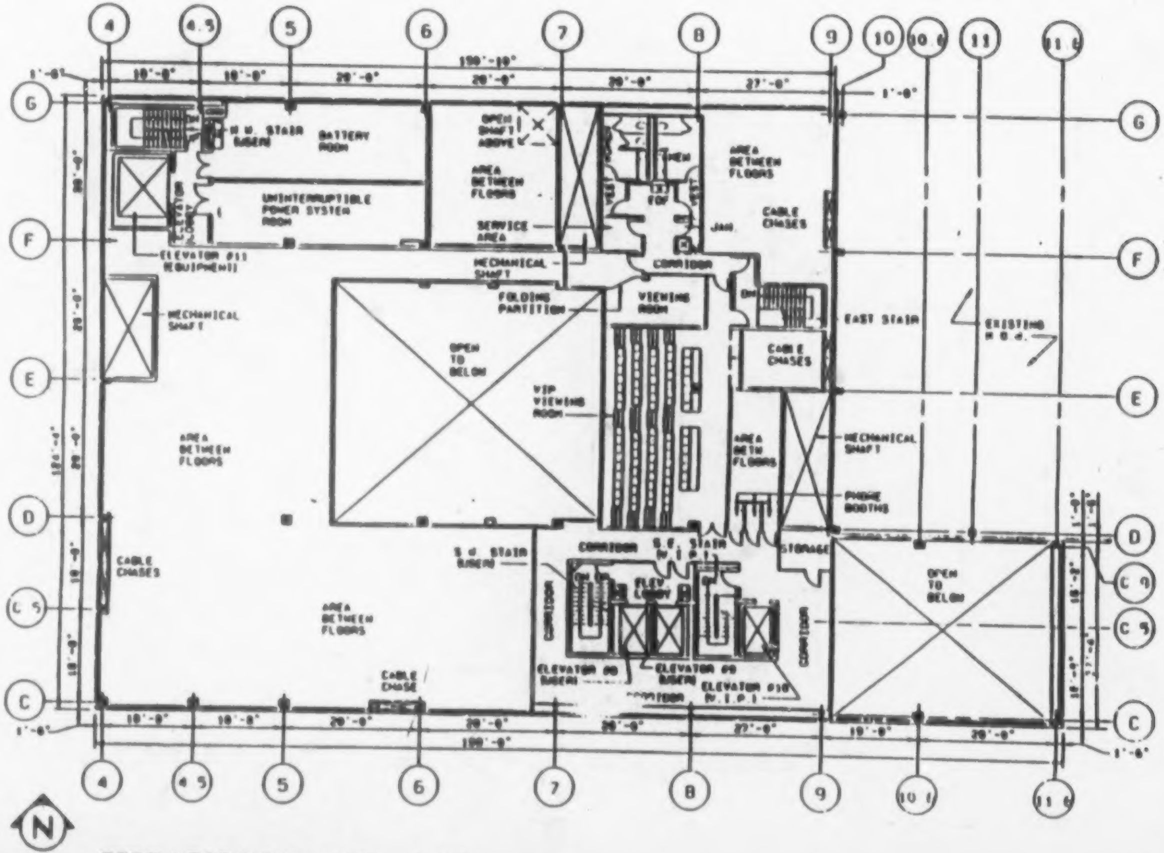
SSCC-FIRST FLOOR PLAN

SPACE STATION CONTROL CENTER


ELECTRICAL ROOM
ELECTRICAL ROOM
N.W. STAIR
ELEVATOR LOBBY
ELEVATOR # 11 (EQUIPMENT)
TEL. CLOSET
CORRIDOR
MECHANICAL SHAFT
WOMEN
MEN
ACTION CENTER
CABLE CHASES
REPRODUCTION/ SUPPLY AREA
MECHANICAL SHAFT
O H DOOR
SPACE SYSTEMS SUPPORT AREA
OPERATIONS CONTROL ROOM
SERVICE AREA
STORAGE
VENDING
LOCKERS
CORRIDOR
OPERATIONS MANAGEMENT ROOM
CABLE CHASES
MECHANICAL SHAFT
EXISTING
S.W. STAIR
S.E. STAIR
ELEV LOBBY
CABLE CHASES
CABLE CHASE
ELEVATOR #9
ELEVATOR #8
ELEVATOR #10
OPERATIONS SUPPORT ROOM
150'-10"
199'-0"
124'-4"
37'-4"
N

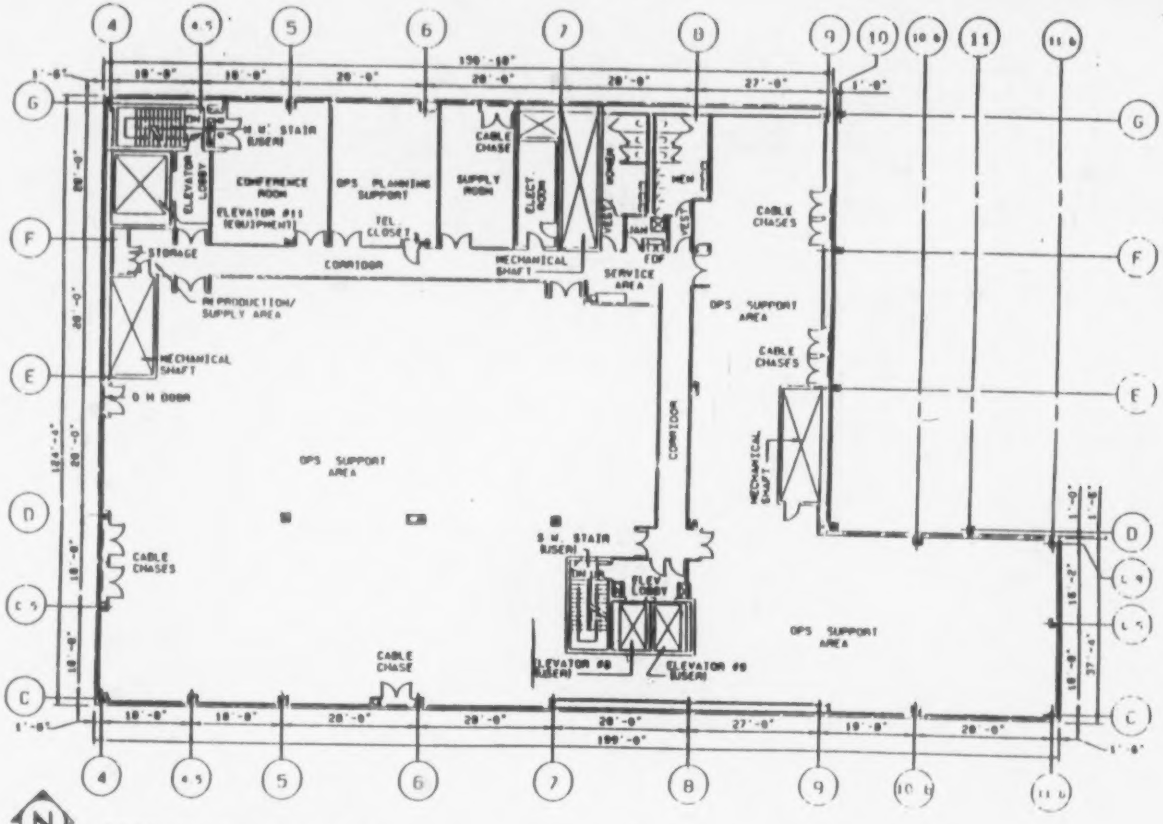
SSCC-SECOND FLOOR PLAN

SPACE STATION CONTROL CENTER


4
4.5
5
6
7
8
9
10
10.6
11
11.6
G
F
E
D
C.9
C.5
C
190'-10"
10'-0"
20'-0"
27'-0"
1'-0"
N.W. STAIR (UGEN)
BATTERY ROOM
UNINTERRUPTIBLE POWER SYSTEM ROOM
ELEVATOR #11 (EQUIPMENT)
MECHANICAL SHAFT
OPEN SHAFT ABOVE
AREA BETWEEN FLOORS
SERVICE AREA
MECHANICAL SHAFT
FOLDING PARTITION
OPEN TO BELOW
VIP VIEWING ROOM
VIEWING ROOM
CORRIDOR
JAN.
CABLE CHASES
EAST STAIR
EXISTING R.O.W.
MECHANICAL SHAFT
PHONE BOOTHS
STORAGE
S.E. STAIR (W.I.P.)
S.W. STAIR (UGEN)
ELEV. LOBBY
ELEVATOR #8 (UGEN)
ELEVATOR #9 (UGEN)
ELEVATOR #10 (W.I.P.)
CABLE CHASE
N

SSCC-MEZZANINE LEVEL PLAN

SPACE STATION CONTROL CENTER


4
4.5
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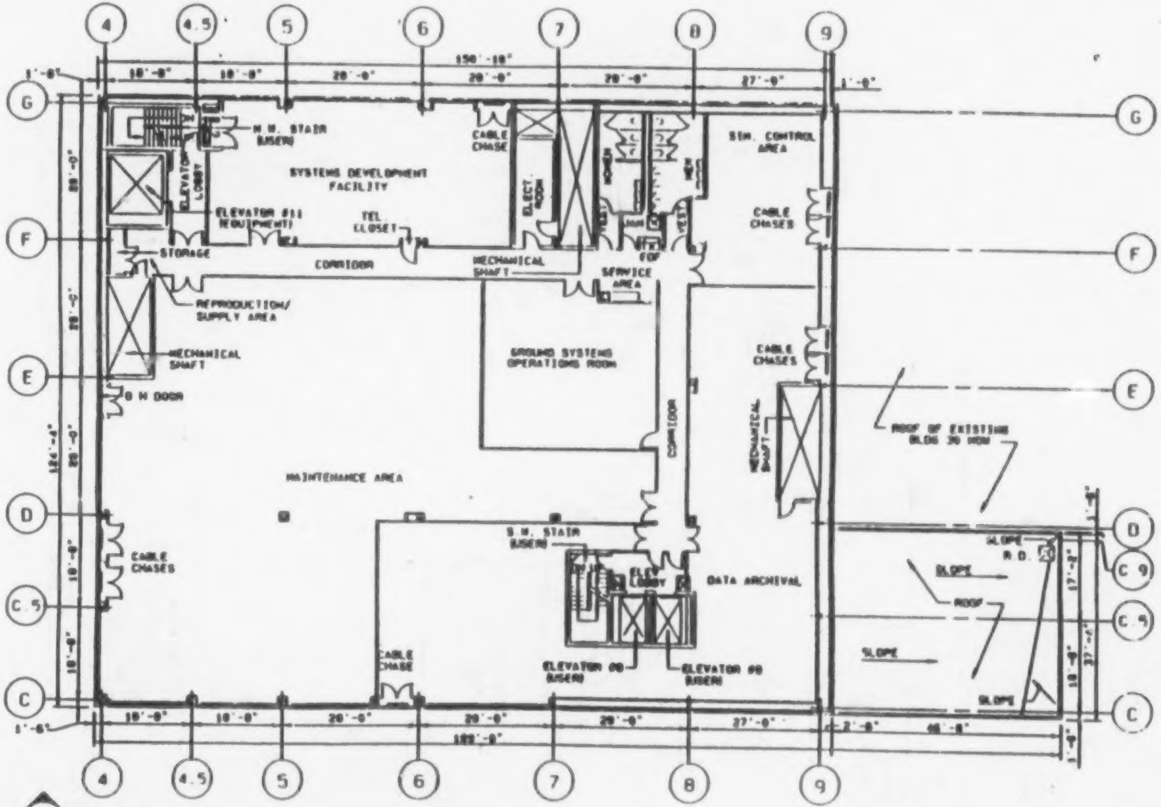
10.6
11
11.6
G
F
E
D
C.9
C.5
C
190'-10"
10'-0"
20'-0"
27'-0"
1'-0"
124'-4"
18'-2"
37'-4"
19'-0"
190'-0"
N.W. STAIR (USER)
ELEVATOR LOBBY
CONFERENCE ROOM
ELEVATOR #11 (EQUIPMENT)
OPS PLANNING SUPPORT
TEL. CLOSET
SUPPLY ROOM
CABLE CHASE
ELECT. ROOM
WOMEN
MEN
VEST
JAN
EDF
MECHANICAL SHAFT
SERVICE AREA
STORAGE
CORRIDOR
REPRODUCTION/ SUPPLY AREA
O H DOOR
OPS SUPPORT AREA
CABLE CHASES
S.W. STAIR (USER)
ELEV LOBBY
ELEVATOR #8 (USER)
ELEVATOR #9 (USER)
N

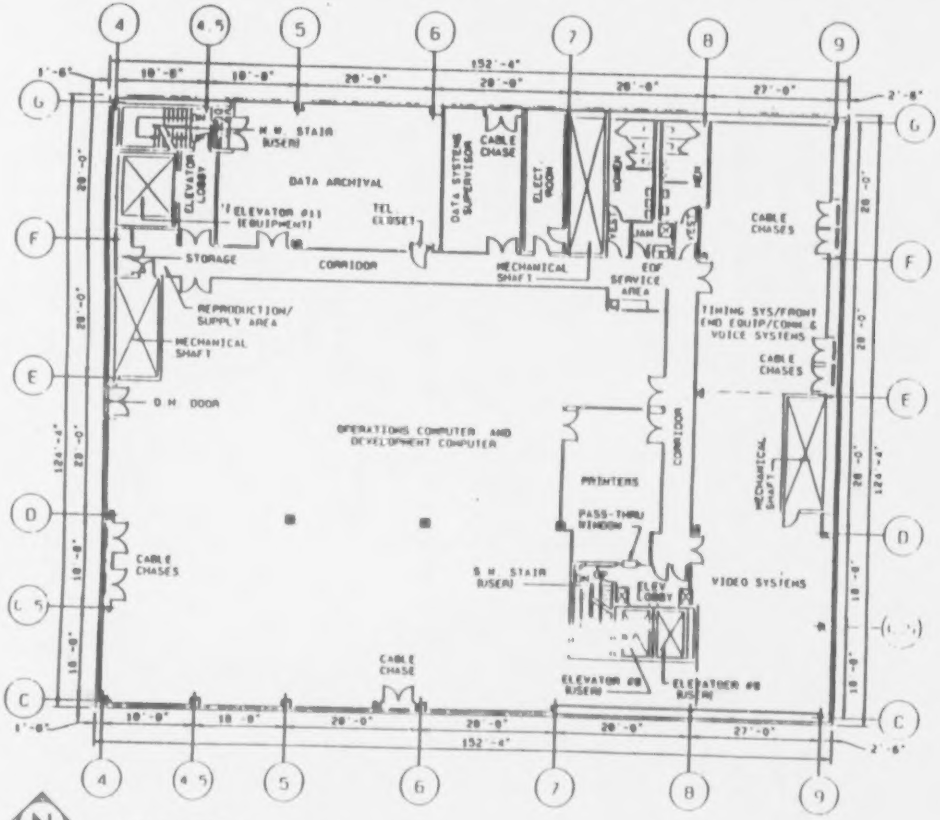
SSCC-THIRD FLOOR PLAN

SPACE STATION CONTROL CENTER


4
4.5
5
6
7
8
9
G
F
E
D
C.5
C
C.9
150'-10"
182'-0"
124'-4"
10'-0"
20'-0"
27'-0"
1'-0"
2'-0"
46'-0"
17'-0"
37'-0"
SYSTEMS DEVELOPMENT FACILITY
N.W. STAIR (USER)
ELEVATOR LOBBY
ELEVATOR #11 (EQUIPMENT)
TEL CLOSET
CABLE CHASE
ELECT. ROOM
WOMEN
MEN
VEST
JAN
SIM. CONTROL AREA
CABLE CHASES
STORAGE
CORRIDOR
MECHANICAL SHAFT
SERVICE AREA
REPRODUCTION/ SUPPLY AREA
GROUND SYSTEMS OPERATIONS ROOM
O H DOOR
MAINTENANCE AREA
S.W. STAIR (USER)
ELEV LOBBY
DATA ARCHIVAL
ELEVATOR #9 (USER)
ELEVATOR #8 (USER)
ROOF OF EXISTING BLDG 30 NOW
SLOPE
R.D.
ROOF

N SSCC-FOURTH FLOOR/LOW ROOF PLAN

SPACE STATION CONTROL CENTER


4
4.5
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G
F
E
D
C.5
C
152'-4"
10'-0"
10'-0"
20'-0"
20'-0"
20'-0"
27'-0"
1'-6"
2'-6"
124'-4"
N.W. STAIR (USER)
DATA ARCHIVAL
ELEVATOR LOBBY
ELEVATOR #11 (EQUIPMENT)
TEL CLOSET
DATA SYSTEMS SUPERVISOR
CABLE CHASE
ELECT ROOM
WOMEN
MEN
VEST
JAN
STORAGE
CORRIDOR
MECHANICAL SHAFT
EDF SERVICE AREA
CABLE CHASES
REPRODUCTION/ SUPPLY AREA
MECHANICAL SHAFT
TIMING SYS/FRONT END EQUIP/COMM & VOICE SYSTEMS
CABLE CHASES
O.H. DOOR
OPERATIONS COMPUTER AND DEVELOPMENT COMPUTER
CORRIDOR
MECHANICAL SHAFT
PRINTERS
PASS-THRU WINDOW
CABLE CHASES
S.W. STAIR (USER)
ELEV LOBBY
VIDEO SYSTEMS
CABLE CHASE
ELEVATOR #8 (USER)
ELEVATOR #8 (USER)

SSLC-FIFTH FLOOR PLAN

NOTICE OF FINDING OF ADVERSE EFFECT
"Equipment Upgrade to Mission Control Center"

The National Aeronautics and Space Administration (NASA) has determined that the proposed equipment upgrade will have an adverse effect on the Mission Control Center, since the modifications will involve a changeout of equipment, as described on the attachment. Accordingly, please provide your written comments within 30 days. The following documentation is provided in response to each item listed in 36 CFR 800.8(d):

(1) A description of the proposed equipment upgrade is provided in the attachment. Please note that the activity does not involve any structural changes to the room or building.

(2) The MCC was designated as a National Historic Landmark by the Secretary of Interior, December 24, 1985.

(3) The MCC is significant because Apollo 11, man's first landing on the Moon, July 20, 1969, was controlled from the Mission Operations Control Room.

(4) The equipment changeout is essential for the flight control systems technology upgrade that will meet future space flight mission requirements.

(5) The Agency proposes to document the original state of the MCC and retain the original equipment for future determination of appropriate disposition.

(6) The State Historic Preservation Officer (SHPO) has suggested that the equipment be retained in place; however, the Agency has determined that the modifications are absolutely essential to satisfy the operational flight control requirements for the Space Shuttle flights manifested through the 1990's.

(7) In keeping with 36 CRF 800.3(b), the Agency has been in contact with the SHPO on an informal basis since June 11, 1987. Documentation of these informal contacts exists, but does not address the equipment changeout in specific detail.

(8) The MCC is an operational space flight facility, and there has been no demonstrated need for additional consultation.

(9) See the attachment for a schedule of the equipment upgrade.

(10) See item 7 above.

We would appreciate your written comments.

MISSION CONTROL CENTER UPGRADE (MCCU)
Lyndon B. Johnson Space Center
Houston, Texas

SUMMARY OF PREVIOUS UPGRADES

Technical upgrade modifications to the Mission Control Center (MCC) flight systems are mandatory in order to meet the dynamically changing requirements of evolving technology characteristic of the Nation's space program. The components and the configuration of the MCC must change as we pursue our goal of striving to maintain technical preeminence in the international space community.

The following is a description of the modifications, deletions, and additions which have been made to the two flight control rooms (FCR's) since the Apollo Program. This listing includes equipment cabinets and consoles in the FCR's and the MCC support rooms, as well as facility wall changes in various areas of the MCC:

1. All MCC display-control system equipment has been converted to the Console Input System (CONIS). This was a major MCC project that affected every console in the MCC (approximately 150) and all display-control subsystems that supported the consoles. This project was implemented in phases from 1979 to 1984. Every console in the MCC was removed and stripped of all components. The old technology components were sent to surplus and replaced with the new CONIS technology. While the consoles were away in the manufacturing area, facility modifications including deletions and relocations of walls in the support room areas were accomplished. In all cases, once the consoles were returned to the MCC, they were placed into an assembly schedule and remounted according to use, not according to originality.

2. The electronic support equipment cabinets located in the support rooms (supporting the 150 consoles mentioned in item 1) were all redesigned and replaced with the CONIS equipment, which remains in operation today. This allowed the removal of 85 electronic equipment racks and provided space for the new transition flight control room supporting the MCC equipment upgrade.

3. In early 1984, the second floor FCR control consoles were dismantled and sent to the manufacturing facility for repainting from the green to brown color scheme. As a result of flight control requirements, the consoles were placed in different locations when returned. The wallpaper, furniture, and carpet were changed to brown tone complements, but glass projection screens, window and wall locations were not changed.

4. All vacuum tube type console-mounted television monitors have been removed and replaced with solid state units.

5. The rear screen Eidophor projectors were replaced with new GE light-valve type projectors.

6. The flight control teams normally identify changes required from one flight to the next and, as a result, the total estimated change of consoles since the 1984 refurbishment is approximately 20 percent.

7. The MCC computer system has been changed twice since the Apollo Program. In 1975, the 360/75 computer and all peripherals were replaced with the larger 370/168. In 1986, all these host computers in the MCC were again changed out and upgraded to the 308X series.

PROPOSED UPGRADE

The MCCU is a program to replace aging equipment of older technology located on all three floors of the MCC. The equipment in place is outdated and deteriorating. It is showing signs of increased maintenance problems, decreased mission support reliability, and the loss of vendor support due to discontinued manufacturing. Expansions and enhancements to the older equipment are difficult, since the high-skill labor requirements are intensive, costly, and time consuming. Current old technology equipment requires excessive mission-to-mission reconfiguration time and makes the projected-mission flight manifest difficult to meet. The existing equipment reduces the capability to respond to late or unexpected mission requirements.

SUMMARY

The MCC is used continuously for flight preparation and support functions, requiring an implementation of upgrades without disrupting ongoing mission operations. MCCU capabilities will be accomplished by a phased approach that will allow the flight control team to become familiar and grow with the systems as they are implemented. This new MCCU capability will be accomplished by utilizing a transition flight control area located in the MCC. This approach proposes to minimize implementation risks and allows a course of correction to the system design prior to operational use. Concepts and capabilities will be proven prior to essential mission support and, at the same time, training can be provided to the flight control team members.

The attached MCCU Implementation Schedule identifies proposed upgrades to be accomplished in the 1989-1994 timeframe:

1. The delivery of System 2.3, which is scheduled for May 1989, involves new host computer program software in addition to 33 new flight control workstations, some of which will receive real-time data from a local area network (LAN). The MCCU program will include complete installation of a new fiber optic backbone system for distributing data throughout the building. This new fiber optic technology will eliminate the massive numbers of copper cables previously used for this function. The MCCU fiber optic backbone system will be utilized for all LAN functions in the future. Copper cables will not be removed until all old technology console systems are removed, approximately October 1993. The System 2.3 is one increment of the MCCU program which extends to the delivery of System 2.13, which is scheduled for late 1994.

2. The MCCU delivery of Systems 2.5 through 2.13 involves incremental software enhancements for host computers and workstations. Enhancements in the LAN will also be incorporated. The installation of the Digital Voice Intercom System (DVIS) key sets will begin in late 1989 and will be completed in late 1990. The old voice key sets will be removed as the DVIS key sets are installed. After removal of all voice key sets, the old mainframe and support equipment will no longer be required and will be removed by the support contractor. After testing, verification, and acceptance by the flight control community of System 2.5, the old technology consoles will be removed and replaced with new workstations. This action will continue incrementally through delivery of System 2.13 in late 1993 (see attached photo for artist's conception).

3. The last groups of consoles to be upgraded to workstations are the two flight control rooms (FCR's) which are scheduled for console changeout beginning mid-1993. After the last old technology consoles are removed, all support equipment for the old CONIS console system will be removed, approximately late 1993.

4. The FCR projection area (behind the screen) will receive new projectors in the mid-to-late 1990 timeframe. The old glass screens may be replaced with new screens at that time. The old projectors and the old mirrors will be retained until the new projector system has been proven and verified. Present schedule shows facility-type wall and screen modifications occurring in the early 1993 timeframe.

5. MCCU Step 4 identifies communication front end system equipment removal and upgrade in mid-1993.

JSC is implementing the following historic preservation actions to document the Apollo FCR configuration and to retain the original equipment for any future replication.

a. Representative equipment not already archived will be cataloged for retrieval.

b. A complete photographic documentation of the Apollo FCR's will be available from the JSC archival files.

c. Technical documentation including drawings and specifications of the basic room, structure, utilities, configuration, flight control systems, control consoles, and visual displays will be compiled and available on request.

d. Flight plans, checklists, procedures, and some planning documents will be made available.

e. Vertical visual mission status display panels will be retained and made available for possible future relocation.

f. Locations will be provided both inside and outside the MCC for the installation of suitable State Historical Preservation Office (SHPO) plaques presenting historical information.

g. Locations will be made available for artistic renderings inside the FCR as appropriate.

h. NASA will explore the potential for replication of the Apollo Flight Control Room to be included in Phase II of the planned Space Center Houston (public visitor center).

QUESTIONS SUBMITTED BY SENATOR ALFONSE M. D'AMATO

Question 1: Mr. Myers, NASA is about to embark on what has been called a new "Golden Age of Exploration," using unmanned planetary probes. These include the Magellan mission to Venus, the Galileo mission to Jupiter, and the Mars Observer mission in 1992.

a. Does NASA intend these missions to be complementary to each other -- each contributing in a different way to our overall understanding of the solar system?

Answer 1a: Yes, understanding the birth and evolution of our planetary system has been a goal of the United States civilian space program for the three decades that NASA has been in existence.

NASA's current and planned planetary exploration missions serve this goal and are highly complementary.

With a new start for CRAF/Cassini in FY 1990, an active and exciting United States planetary program is assured well into the next century. CRAF/Cassini will complement NASA's planetary exploration missions already underway and enable the United States to lead a succession of planetary missions in the prime exploration phase essentially continuously from 1990 to 2006.

The Magellan spacecraft to Venus, launched in May of this year, will orbit the planet beginning in 1990 and will return new data for several years. In 1992, Mars Observer will be launched to Mars to study the geochemistry of its surface, and will continuously observe the planet from 1993 to 1996. The Galileo spacecraft, to be launched in October of this year, will be in operation at Jupiter from 1996 to the end of the century. With a FY 1990 new start approval for CRAF/Cassini, CRAF will be at its comet from 2000 to 2003, and Cassini will be in operation in orbit at Saturn from 2002 to 2006.

Thus, the United Stares will have a major solar system exploration mission in its prime data collection phase continuously from 1990 to 2006 and will be in a position to make in-depth comparative studies of the origin and evolution of both the "terrestrial planets" in the inner solar system (Venue and Mars) and the more primitive outer solar system bodies (Jupiter, Saturn, comets and asteroids).

Question 1b: If so, how will this year's proposed new starts -- the Comet Rendezvous Asteroid Flyby (CRAF) Mission and the Cassini Mission to Saturn -- Contribute to the overall exploration strategy?

Answer 1b: NASA's Office of Space Science and Applications 1989 strategic plan provides for this nation to continue its world leadership in space science through a major initiative in solar system exploration: CRAF/Cassini.

The successful implementation of CRAF/Cassini as an upcoming flight program is of the highest priority if we are to sustain U.S. preeminence in exploration of the outer planets and, of primitive bodies (comets and asteroids) which may hold the secrets of the origin of life in the solar system.

NASA's overall exploration strategy is guided by the National Academy of Sciences' Committee on Planetary and Lunar Exploration (COMPLEX) recommendations which call for a threefold progression from 1) reconnaissance, or fast flybys, through 2) exploration, which is achieved by orbiters and probes, to 3) intensive study, which is implemented by landers and sample return missions. COMPLEX has further recommended that this strategy be applied to the three regions of the solar system: the inner solar system (terrestrial planets); primitive bodies (comets and asteroids); and the outer solar system (the gas giants and their moons). NASA's CRAF and Cassini missions are direct applications of the strategy outlined by COMPLEX for exploring primitive bodies and the outer solar system.

The outer solar system and primitive solar system bodies, such as comets and asteroids, uniquely preserve the archaeological record of the formation and evolution of our solar system. The Comet Rendezvous Asteroid Flyby (CRAF-Cassini mission will address two fundamental science questions: the origin of the solar system and the origin of life. The program is designed to help determine whether the solar system is the natural result of star formation, and whether the appearance of life is a natural part of the early evolution of planets that are like our Earth.

The program consists of two missions. The first, CRAF, will take a sustained, close-up look at one of the most primitive bodies of the solar system: a comet. Comets are largely water-ice, and are rich in organic material. These are thought to have formed in the outer reaches of the early solar system where they are relatively unaffected by the Sun's heat and radiation and may therefore continue samples of the primitive matter from which the solar system was made. CRAF will address some of the following key science questions about our Earth and solar system:

- Was this organic material part of the solar nebula?
- Did it come from interstellar clouds?
- Did this organic matter play a role in the origin of life on Earth?
- How did the planets form from planetesimals?
- Are Earth's oceans melted comet ice?

The second mission, Cassini, will provide an in-depth look at Saturn and its enigmatic moon, Titan. Titan's atmosphere is primarily nitrogen with elements of methane and other carbon bearing compounds. Titan may even have an ocean of methane and ethane on its surface. Non-biological processes in Titan's upper atmosphere produce complex organic molecules from these simple carbon compounds. The Cassini probe into Titan's atmosphere will address these important science questions:

- Could similar processes on the early Earth have produced the organic material that was needed to start life here?
- Where did Titan's atmosphere come from?
- Does it really have an ocean?

Recent research suggests that Earth's early atmosphere may have been inhospitable to the evolution of organic material and that the necessary complex, prebiotic molecules may have been delivered to Earth from the outer solar system by comets and asteroids. An alternative theory proposes that the primitive terrestrial atmosphere may have been similar to Titan's present atmosphere. Thus, clues to understanding the origin of life on Earth may lie in in the investigation of both the organic material frozen in comets and the synthesis of present-day organic compounds in Titan's atmosphere.

Question 1c: If Congress were unable to fund these new starts in FY 1990, what effect would this have on NASA's long-term planetary objectives?

Answer 1c: Without a new start for CRAF/Cassini in FY 1990, the continuity in NASA's systematic and progressively ambitious exploration of the solar system will be disrupted, leaving a void in the ongoing U.S. space science program now planned through the 21st century.

It is imperative that U.S. planetary exploration does not end in the 20th century. Without the approval of CRAF/Cassini in FY 1990, there will be no planned U.S. planetary exploration in the 21th century. The world community, from both a scientific and technological standpoint will view the U.S. as relinquishing its unchallenged leadership in the field of planetary exploration.

For over two decades, the United States has been unchallenged in its ability to send robotic spacecraft to the far reaches of the solar system with unprecedented accuracy and capability. These human achievements accomplished by machines should not be taken lightly. No other country has demonstrated the ability to transmit spectacular images from worlds never seen before by the human eye. No other country has been able to develop machines which act as our eyes and ears on the next frontier. U.S. spacecraft with names like Mariner, Pioneer, and Voyager evoke the true spirit of exploration and instill a strong sense of national pride.

CRAF/Cassini has been proposed as a new start in FY 1990 in order to make maximum use of several optimal conditions:

1) The scientific community and our international partners fully support CRAF/Cassini as a priority mission for solar system exploration;

2) The celestial mechanics and planetary alignment required for spacecraft to travel to Saturn and a comet are favorable now, but will have changed drastically by the late 1990s;

A FY 1990 new start is crucial to the success of the CRAF/Cassini program because the program is dependent upon perishable launch opportunities. For a 3-year period in the mid-1990's, a planetary alignment similar to that which enabled the Voyager Grand Tour will be available; this will make possible a trip to Saturn with an economical flight time. If this opportunity is missed, the lack of a Jupiter gravity assist will be detrimental to the Cassini mission. Additionally, to achieve sufficient energy for the CRAF spacecraft to rendezvous with the candidate cometary target, our current launch capability dictates the need for gravity assist trajectories. Whether a single flyby of Earth or multiple flybys of Venus and Earth are employed, the phasing of these bodies with each of the candidate comets determines when launch opportunities exist.

In order to rendezvous with the baseline Comet Kopff in 2000, CRAF must launch in August 1995. Two backup launch opportunities exist in 1996 for, Comet Wild 2. After the CRAF 1996 backups, launch opportunities for CRAF deteriorate dramatically: cruise times for the 1997 launch opportunities are three to four years longer than that for the baseline (with comet arrivals in 2005 or 2006), and no launch opportunities exist in 1998. Cassini's last launch opportunity with a Jupiter gravity assist is May 1997, with the optimal launch being April 1996. For launches later than the 1996 baseline, Cassini requires an additional year or more to reach Saturn. The cost to the spacecraft design for backups beyond those described will be higher due to additional thermal design rework needed for Venus flyby trajectories.

In order to have adequate development time to meet the baseline launch opportunities, development (i.e., the new start) must begin in FY 1990.

BACKGROUND: Although the first set of questions are no longer germane, the entire set of questions, as posed in May of this year, are addressed.

Question 2: The initial questions derive from a statement from Senator D'Amato to Mr. Dale Myers, the Deputy Administrator for NASA at that time. The statement was that "Secretary of Defense Cheney announced last week that the National Aero-Space Plane (NASP) program will be transferred from the Air Force to NASA and that $100 million of FY 1990 Defense funds will be proposed for transfer to NASA for the program."

Since the questions themselves are no longer appropriate, they are not specifically answered here. A general, more appropriate response follows:

Answer 2: Subsequent to the formulation of questions regarding the future funding and execution of the NASP program by Senator D'Amato, the entire topic was reviewed by the National Space Council. The implementation of their recommendation, endorsed by the President, ensures that the NASP program remains a joint effort between the DOD and NASA. As in the previous development of other experimental aircraft, such as the X-1 or X-15, NASA provides strength in critical areas relating to research and the Air Force provides most of the staffing and organizational infrastructure for technology development and vehicle acquisition.

The new schedule and funding plan reflect a coordinated effort between the Air Force and NASA. The intent is to maintain the NASP program at a level and pace that should produce the greatest chance for reaching the program goals in a cost-effective manner. Reaching the goals still remains a formidable challenge.

Question 3a: Misperceptions seem to persist inside the Government that the NASP technology of hypersonic flight will primarily be useful in commercial applications such as the 'Orient Express' concept. Do you feel that this program should be predominately driven by civil or military needs?

Answer 3a: The NASP is a research vehicle that will validate and demonstrate new technologies over the speed range all the way up to orbital velocity. Subsequent future derivative vehicles for both civil and military uses that fly to orbit could provide vastly improved access to space. The strong emphasis on single-stage-to-orbit technologies is important to both civil and military communities; technologies that apply to hypersonic cruise are also expected to have applications for both types of missions. When we fly this airbreathing X-30 from M=3 (SR-71) up to perhaps, M=15, we will be better able to determine which civilian and military missions are practical. Neither military nor civil needs control the program.

Question 3b: If civil needs alone are considered, won't the program languish in the labs because of insufficient funds?

Answer 3b: A NASP-type program with few military applications would provide DOD with little incentive for involvement. However, the NASP program does provide for such applications. DOD reallocation of funding restores the pursuit of the program through Phase II, which concludes with a decision by the National Space Council on whether or not to proceed with building the X-30 vehicle.

Question 4a: Your request of $2.05 billion for the Space Station in FY 1990 represents an increase of more than 100 percent over last years appropriation of $900 million. What activities account for this dramatic increase in 1990?

Answer 4a: The Space Station Freedom budget increase, which is consistent with the program funding profile submitted to Congress last year, is typical for the early design stage of a large research and development program. Most of the requested increase is for expanding design activities and development testing by the four work package contractors and their subcontractor teams. Many of these subcontractors were not in place in early FY 1989, but will be very active when the next fiscal year begins.

The major schedule driver for the expanding level of program design activity is the sequence of preliminary design reviews planned for summer 1990. Preliminary designs of all program elements, from the smallest assemblies to entire systems, must be completed by that time to allow in-depth review by program management. Only after this process is completed can the program begin finalizing detailed designs in preparation for fabrication of most final hardware.

Question 4b: The House Appropriations Committee recently requested that you outline the impact of a possible $400 million cut from your Space Station request. Have you given any thought to how you would handle such a cut?

Answer 4b: Yes. NASA has extensively assessed the potential impact of such FY 1990 budget cuts since July 1989, and we question whether a stable and sustainable program can be maintained at this level. After several months of detailed study by both an independent NASA team and the Space Station Office, our assessments to date indicate that any significant reduction would have a strong negative impact on the program. We would attempt to minimize impact to the program's schedule for early operations, but important capabilities (e.g., crew size, power, and data transfer rate) have to be deferred, and relations with our international partners would be adversely affected.

Question 4c: NASA had already been forced to delay the Station twice. What effect would a third delay have on NASA's long-term goals and objectives?

Answer 4c: Yet another delay would be a major setback for the entire U.S. space program because of Space Station Freedom's central role in NASA's long-term plans for space research, technology development, exploration, and applications. For example, the Station is important for any future U.S. missions to the Moon and Mars. These missions will be feasible only after we have an orbital facility for performing extensive research on the long-term effects of the space environment on people, and enhanced to assemble potential advanced space vehicles, and to serve as a transportation node for people and equipment travelling beyond low earth orbit. These functions can be provided only by a space station.

QUESTIONS SUBMITTED BY SENATOR CHARLES E. GRASSLEY

General Budget

Question: As you know, function 250, the Space Science budget function, falls well over $1 billion below the President's request in both the House and Senate budgets. Although the Senate's budget makes no assumptions how these reductions will be met, can you tell us how you would trim $1 billion from the NASA budget?

Answer: A reduction of a $1 billion in Function 250 would have a profound and destructive impact on this country's investment in the future in science, space and technology and in our long term productivity. It would have a devastating impact on efforts to regain momentum in the nation's space program. Of the total budget request for NASA in FY 1990, nearly 99% is necessary to continue programs already approved by the Congress and under way. We believe that the President's budget request is the minimum funding level necessary to carry out the national space policy and a reduction of that magnitude would result in a major restructuring of the NASA program that would probably impact all activities.

Question: I see that you are starting two new programs - the CRAF/Cassini mission to Saturn and the High Speed Civil Transport initiative. Although you are asking $55 million for these projects during FY 1990, we could be talking about just short of $2 billion during the next few years for these programs. Would these be candidates for delay in the event funding reductions were required?

Answer: Although in general it seems clear that the delay or deferment of new programs is generally the least disruptive to implement in a restructuring of a program that is not always the case with research opportunities. The NASA FY 1990 budget request represents a balanced program and delay of either CRAF/Cassini or the High Speed Civil Transport is contrary to meeting important objectives of the Nation's space and aeronautics programs. CRAF/Cassini will keep us on an effective course in exploration of the outer planets - an area of strong U.S. leadership. It is particularly important to begin CRAF/Cassini because of the launch windows associated with the planetary alignments. If CRAF/Cassini is not started in FY 1990, the next window would not occur for seven years. The high speed civil transport technology is an important element in maintaining our country's dominant position in civil aviation.

Space Station

Question: You are asking for $2.05 billion for the space station, a large increase over the $900 million appropriated for FY 1989. Yet there remains to be released of this $900 million about $515 million on May 15, 1989. Can NASA efficiently utilize such large amounts during what amounts to a 16 month period?

Answer: Yes. Prior to May 15, funding limitations resulted in significant constraints on prime contractor activities and subcontractor involvement. The requested level of funding will enable the contractors to proceed in an order on the design of the Space Station Freedom, including development of subsystem test articles and investment in needed supporting capabilities. This buildup is essential if further program delays and cost inefficiencies are to be avoided.

Question: What would be the consequences of reducing the amount for the space station, say about $400 million during FY 1989, and then looking at a supplemental appropriations down the road if the funding is needed?

Answer: A $400 million reduction in FY 1989 would curtail the ongoing development effort and, in all likelihood, cause a stoppage of work by the contractors. The contractors would have to dismiss personnel immediately, and the resulting overall schedule slip would be significant. The restart costs and inefficiencies would drive total dollar values higher and would slip schedule even further.

Question: As we move from the concept development phase of the space station, into the actual design and construction, do these large appropriations also represent assurances of U.S. commitment to the station?

Answer: Yes. The budget requests for the Space Station Freedom program in FY 1990 and beyond represent the needs of the program as detailed design and construction of station systems and elements gets underway. Appropriations consistent with these needs also demonstrate to the public and to our foreign partners that the

U.S. is maintaining its existing commitment to the space station program.

Question: Some estimate that the Space Station could eventually cost as much as $30 billion. In view of our tight budget situation, I am pleased that we have been able to enter international agreements which may bring as much as $7 billion from other countries. Do you believe that it is possible to secure a larger financial commitment from our foreign partners?

Answer: First, the current development cost of the Space Station is estimated at $19 billion. If all other cost such as transportation, personnel and facilities and operations associated with the station are included, then the cost to the U.S. does approach $30 billion. However, much of these costs would be incurred anyway.

Under the international cooperation agreements signed after several years of negotiations, our international partners will supply unique Space Station elements valued at $7-8 billion. It is unlikely that we could obtain greater budget commitments from our partners, for their contributions already represent significant portions of their respective space research and technology budgets. Moreover, increasing the partners' contribution would entail restructuring existing agreements to transfer responsibility from some U.S. elements to the partners. Even if this were acceptable to the partners, it would not be in the interest of U.S. users because utilization allocations were determined based on the existing set of hardware contributions. In all likelihood, the partners would insist that such a transfer of hardware responsibility be accompanied by an increase in their utilization, which would thus reduce future U.S. use of the Space Station.

Question: Do our agreements allow enough flexibility to negotiate larger commitments from our partners if the need arises? Under what circumstances? If our budget deficit forces a reduced U.S. commitment, or at least a set back in our time line?

Answer: The agreements make no provisions for securing larger commitments from our partners, since the division of responsibilities for the baseline space station is regarded as final by all participants. However, the agreements do provide for further cooperation with our partners in the evolution of the space station configuration, providing the possibility of additional budget commitments on their part for future space station growth.

Question: What are the possibilities of bringing additional countries into the space station project?

Answer: The international agreements assign responsibility for all elements of the baseline space station. Each partner can elect to work with other countries on space station payloads, but its total allocation of utilization resources will remain unchanged. In addition, it is expected that other countries could participate in the evolution of the space station.

Third Party Financing

Question: Your budget assumes third party financing for about

7 projects costing over $200 million in FY 1990. Describe the reception to this idea and interest expressed by private industry.

Answer: Both of the proposing contractor teams - submitted proposals for private financing of the Advanced Solid Rocket Motor production facilities which were doomed to be responsible and beneficial to the Government by the NASA Source Evaluation Board. If the termination liability legislation is passed, contract negotiation with the successful offeror will focus on the private investment proposal.

The draft Requests for Proposals for the Neutral Buoyancy Laboratory at the Johnson Space Center and the Space Station Processing Facility at the Kennedy Space Center have been provided to interested prospective contractors for comment, and we expect to have assessed the specific interests and feasibility of proceeding to a formal RFP stage in the July timeframe.

A separate proposal for constructing and financing the Observational Instruments Laboratory at the Jet Propulsion Laboratory (JPL) by the California Institute of Technology is presently under consideration by NASA. Costs, program, and operational benefits of the proposal are being examined. Cal Tech staffs, operates, and maintains JPL by contract for NASA as a federal funded research center. In this particular case, sharing the use of the proposed facility with private industry is not considered to be feasible by NASA.

The potential for private investment in the Extended Duration Orbiter is being discussed with the prime contractor, Rockwell International, who has indicated a serious interest in exploring such an option. Teledyne Brown has also expressed a possible investment interest in conjunction with Rockwell.

The Space Station Docking Module is not a time critical item at this stage, and therefore, we have elected to focus our principal efforts on the other potential projects.

The Flight Telerobotic Servicer (FTS) was also considered for private sector investment, but was subsequently removed due to the mature status of the procurement source selection process. However, NASA is reserving the option, through the FTS contract negotiations to offer intellectual property, rights and access to use FTS production equipment, tooling and facilities to assist the private sectors in developing future applications.

Question: What are your plans if private funding cannot be found? Will you scrap these projects? Postpone them? Or will other programs be cut, and if so, which ones?

Answer: If private investments are not obtained, NASA will have to reassess its total FY 1990 requirements and priorities. It is premature at this point to attempt to identify specific program impacts.

Question: What kinds of procedures and criteria have you established for these third party financing arrangements?

Answer: NASA has solicited responses from private sector firms for interest in investing in the planned ground facilities. Based on positive responses to those solicitations, we have circulated draft requests for proposals (RFPs) for comments and recommendations. After assessing the comments received on the draft RFP's, decisions will be made as to the feasibility of proceeding with formal RFPs. A principal consideration is to seek out private sector investments that are economically advantageous to the Government and fully meet the mission requirements of the particular programs requiring the facilities. Proposals that have the potential for lowering costs to the Government through multiple use or shared use of the facilities are being encouraged. Proposals received in response to the RFPs will be subjected to detailed analyses as part of the evaluation process. It is possible that shared use of some facilities may not be practicable and other factors will have to be considered and weighed accordingly.

Distribution of NASA Contracts

Question: At the risk of sounding parochial, I note vast differences in the geographical distribution of NASA prime contract awards. During FY 1988, the seven Plain states which includes Iowa, received only $52 million in NASA contracts, whereas other parts of the country such as the four Far West states received over $2.4 billion and the Southeast states received over $2.2 billion in NASA contracts. Can you explain this? Are you not obtaining contract bids from large segments of the country?"

Answer: Approximately 80 percent of NASA awards are made on the basis of full and open competition. While we try to broaden the base by identifying as many viable sources as possible, our selections are based on obtaining the best value for each requirement. Geographical location is not a selection factor except in rare cases where rapid response is needed for a particular requirement. The geographic areas receiving the bulk of NASA's contract awards correspond to those containing one or more NASA facilities. Of necessity a significant portion of NASA's work is performed at or near these facilities. Another major portion of our work is performed by the major aerospace firms whose facilities are concentrated in the far west. In addition, a substantial portion of the work that is included in NASA prime contracts is further subcontracted, resulting in additional geographical dispersion. NASA is, of course, mindful of the provisions of our annual appropriation bill which encourages the geographic distribution of our awards. NASA has for years made every effort to solicit a broad spectrum of sources from all parts of the country. We hold meetings for firms interested in doing business with NASA and actively participate in Congressionally sponsored small business conferences as well as other conferences for the purpose of identifying additional sources for NASA work. Recently, NASA attended a Federal Procurement Conference sponsored by Senator Kit Bond in St. Louis, Missouri. Another will be sponsored by Senator Rudy Boschwitz in Minneapolis, Minnesota in the near future. These conferences allow participating agencies to actively seek new sources for existing and future requirements. NASA would be pleased to participate in any conferences with firms from the Plains states that you may care to sponsor.

Question: While the NASA Engineering Research Centers (ERC) program might support research work on certain subjects related to space operations, is there currently a single, focused program of NASA space operations research?

Answer: No. However, we are currently studying the need for such a program.

Question: Is there a need for new University Programs to train engineers in the space operations field? What efforts has NASA taken to encourage the development of the kind of university-based engineering curricula that would help ensure the availability of a trained operations and engineering workforce?

Answer: Currently, NASA is determining if a need exists for developing a new university program to train engineers in the space operations field. If such a need does exist, it would be our intent to work with the university community to design an effort to meet this need.

Question: While NASA regularly supports university-based research, are research grants enough to ensure that the right kinds of undergraduate engineering curricula are developed by colleges and universities to provide for the space operations workforce needed in lunar and mars missions?

Answer: Our experiments indicate that grants are a good mechanism for encouraging the desired curriculum development particularly when structured to meet clearly defined objectives. We are, however, studying the need for additional types of programs.

QUESTIONS SUBMITTED BY SENATOR PETE V. DOMENICI

Global Climate Change

I am most pleased to see the President make a commitment to increased research into global climate change in his FY 1990 budget request. As the attached chart shows, the budget request totals $190.5 million for seven federal departments and agencies to address the phenomenon known as global change. The request represents a $56.6 million, or 42 percent, increase over the FY 1989 funding level for such activities. Support for this request will allow us to proceed with the initial strategy for a comprehensive, long-term global change research program outlined in "Our Changing Planet: A U.S. Strategy for Global Change Research," which accompanied the budget request.

Table 1 on pages 24 and 25 of the report entitled "Our Changing Planet: A U.S. Strategy for Global Change" outlines the proposed global change budget program by agency and science element.

Question: Would you please provide for the record a detailed breakdown, by program, account, and amount what these funds would be used for, if appropriated?

Answer: The $21.5 million of FY 1990 NASA funds proposed for global change research is entirely in the area of advanced technology development (definition studies) for the Earth Observing System (Eos), which is funded within Earth Science Payloads and Instrument Development. The Eos components are intended as payloads on the Space Station's polar platform. Instrument definition and feasibility studies will be conducted together with related system engineering and payload accommodation studies. These Eos studies represent NASA's contribution to the U.S. Global Change Research Program.

Question: Would you also provide a brief summary of the questions the research supported in this initiative would address, and how it would advance our understanding of the potential impacts of global change? How does your agency proposed to coordinate its research efforts under this strategy with the ongoing work of the other federal entities involved in this initiative?

Answer: The report, Our Changing Planet: A U.S. Strategy for Global Change Research, submitted to the Congress with the President's FY 1990 budget, provides an overview of the U.S. Global Change Research Program. The key scientific questions that form the core of the research agenda are:

- What forces initiate global change?
- How does the Earth system respond to changes in forcing functions?
- How has the Earth's environment changed in the past?
- How well can global change be predicted?

The report also provides a framework for a coordinated scientific effort to study the potential impacts of global change. Since its submission, the Federal agencies involved (including NASA) have been working together through the Committee on Earth Sciences of the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET), in developing a coordinated research plan for the program. The plan, which has already been cleared by the agencies and which will be released this summer, provides the following:

- Establishes the scientific rationale for the program
- Establishes the goal sought and its achievability
- Poses the scientific questions that must be addressed
- Describes the implementation strategy
- Assesses the strengths and weaknesses of the current agency programs
- Identifies the highest priority areas of needed research
- Outlines FY 1990 research initiatives and/or augmentations by Federal agency
- Summarizes the overall strategy and integrates priorities that guide the implementation of the program and its research needs

The research plan will be forwarded to you upon publication in July 1989.

SUBCOMMITTEE RECESS

Senator **Mikulski**. Thank you very much. The subcommittee will stand in recess until May 15 at 1:30 when we will take testimony from the Department of Housing and Urban Development. The hearing will take place in SD–138 here.

[Whereupon, at 11:55 a.m., Wednesday, May 3, the subcommittee was recessed to reconvene at 1:30 p.m., Monday, May 15.]

VA, HUD AND INDEPENDENT AGENCIES APPROPRIATIONS FOR FISCAL YEAR 1990

MONDAY, MAY 15, 1989

U.S. Senate,
Subcommittee of the Committee on Appropriations,
Washington, DC.

The subcommittee met at 1:40 p.m. in room SD–138, Dirksen Senate Office Building, Hon. Barbara Mikulski (chairman) presiding.

Present: Senators Mikulski, Grassley, Kerrey, and Nickles.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Office of the Secretary

STATEMENT OF JACK KEMP, SECRETARY

ACCOMPANIED BY

- **MARY BRUNETTE, ASSISTANT TO THE SECRETARY FOR POLICY AND COMMUNICATION**
- **CAROLYN LIEBERMAN, DEPUTY GENERAL COUNSEL**
- **JAMES E. SCHOENBERGER, GENERAL DEPUTY ASSISTANT SECRETARY FOR HOUSING, DEPUTY FEDERAL HOUSING COMMISSIONER**
- **THOMAS SHERMAN, ACTING GENERAL DEPUTY ASSISTANT SECRETARY FOR PUBLIC AND INDIAN HOUSING**
- **LOUIS GASPER, EXECUTIVE VICE-PRESIDENT, GOVERNMENT NATIONAL MORTGAGE ASSOCIATION**
- **ANNA KONDRATAS, SPECIAL ADVISOR TO THE SECRETARY FOR COMMUNITY PLANNING AND DEVELOPMENT AND RESEARCH**
- **THOMAS HUMBERT, DEPUTY ASSISTANT SECRETARY FOR FAIR HOUSING AND EQUAL OPPORTUNITY**
- **DONALD J. KEUCH, JR., DEPUTY ASSISTANT SECRETARY FOR ADMINISTRATION**
- **PAUL ADAMS, INSPECTOR GENERAL**
- **TIMOTHY COYLE, ASSISTANT SECRETARY FOR LEGISLATION AND CONGRESSIONAL RELATIONS**
- **PATRICIA CARLILE, EXECUTIVE DIRECTOR, INTERAGENCY COUNCIL ON THE HOMELESS**
- **ALBERT J. KLIMAN, DEPARTMENTAL BUDGET OFFICER**

OPENING REMARKS OF SENATOR MIKULSKI

Senator Mikulski. The subcommittee will come to order.

Today we are pleased to begin the first of 2 days of hearings on the Department of Housing and Urban Development and its fiscal 1990 budget.

No issue grips the Nation's consciousness more than the plight of those who suffer from inadequate shelter. Whether it is a homeless woman sleeping on a grate, whether it is a family that lives in a welfare hotel, or a young couple struggling to come up with the funds to buy their first home, the lack of affordable housing is one of the most significant problems being faced by Americans.

This problem has become worse in the last 8 years, in part because HUD's budget has been cut by over 60 percent and assisted housing programs have been reduced by over 80 percent during that period.

In addition, recent revelations by HUD's Inspector General suggest that there was frequently little stewardship or public responsibility exercised by some within HUD who were supposed to manage those declining dollars.

Tomorrow we will hear from the IG on this problem, and today we will ask the Secretary about some of the policy reforms he has in mind about this matter.

But amidst all of these problems about the decline in the Federal Government's role in helping Americans achieve a portion of the American dream, I am happy to welcome our Secretary of HUD, Mr. Jack Kemp.

In his brief time in office, the Secretary has brought new energy and vitality to the Department. He has been a hands-on Secretary. He has gotten out and he has met with mayors, local officials, homeless shelters. He actually sat down and talked to people who lived in public housing, to listen to concerns of those who far too often had no voice.

Mr. Secretary, we thank you for your work, and we look forward to working with you.

The Department is requesting $12.93 billion for fiscal 1990, a 1.5-percent increase over the fiscal 1989 appropriation. That request is still 51 percent less in actual dollars than what it was under HUD Secretary Carla Hills in the last year of the Ford administration. In the last year of the Ford administration, Secretary Hills presided over a budget of $26.5 billion, in 1976 dollars.

I think that should give us a perspective of where we were then and where we are now.

Housing is a top priority of mine, as the new chair of this subcommittee, borne out of my own experience as a social worker in the city of Baltimore. That city as of this afternoon has 34,000 people waiting to get on public housing or some type of assisted housing.

It is my hope to work with the Secretary to prevent public housing from becoming small business incubators for drug dealers. If we are going to have small business incubators, they are going to be enterprise zones for some of the newer kinds of activities that will generate jobs.

In addition, I intend to press the Department to step up its effort to modernize public housing. The administration's $1 billion modernization request for 1990 leaves a lot to be desired when HUD's studies suggest it is in the $10 to $20 billion range.

Finally, it is my hope that this subcommittee can work with the Department to fashion a responsible policy to deal with the nearly 1 million assisted housing contracts which will require renewal over the next decade. This issue, combined with the looming problem of 221(d)(3) mortgage prepayments, is one for which there has been a vacuum in developing a fiscally prudent bipartisan strategy. The issue will be what will we be doing with expiring certificates and vouchers and also with the preservation of existing housing stock.

Mr. Kemp, we look forward to hearing your testimony, but I would like to also turn to my colleagues to see if they have any opening statements.

The chair would like to recognize the Senator from Iowa, Mr. Grassley.

Senator GRASSLEY. I don't have any opening statement, Madam Chair, but I do welcome my friend from the House of Representatives and now the administration to his position. As you have said, Madam Chair, he has been very vigorous in his approach to the job. We all appreciate that very much. We look forward to working with him, and I will have some questions at the end of his statement.

Senator MIKULSKI. Senator Kerrey.

Senator KERREY. Madam Chair, I also have an opening statement that I would like to submit for the record.

Senator MIKULSKI. Without objection.

RECOGNIZING SECRETARY KEMP'S EFFORTS

Senator KERREY. Secretary Kemp, I would also echo the chair in the homage I pay to the enthusiasm with which you have approached your task to make sure that housing is available to all Americans, and you have identified as well that it is currently not available to all Americans, that it has become increasingly difficult for many Americans to afford homes. It has become extremely difficult in some instances for Americans to live in public housing.

You have become friends in a short period of time with the director of the Omaha Housing Authority in Nebraska, Bob Armstrong, who has been extremely innovative in the recommendations that you have made, in particular your recommendation with regard to drugs. Bob has put it in place in Omaha already. So I applaud in general the effort.

One of the things I would just call to your attention in my opening statement—and I will follow with some additional questions—is that there is a perception of HUD that it is a bloated and inefficient bureaucracy.

I applaud the selection of people that you have made. I understand you have brought some awfully good people in to HUD, but the perception, nonetheless, is out there. You are aware and I see in your testimony as aware that you reference some of the things that have happened recently that have brought renewed attention to some of the difficulties that HUD has had in the past.

You have got your hands full, in short, in that regard, and I simply, as one Democratic member of this committee, pledge to you my support as you make an effort to make this Department run more efficiently.

Finally, I would say to you, Mr. Secretary, that there is an increasing amount of attention brought to the fact that in the United

States of America we spend less on the poor than we should. I am sure you saw the recent report that the Ford Foundation put out calling for a $29 billion per year increase in expenditures on the poor, understanding, by the way, in the report the importance, as you recognize in your own testimony, of making certain that there is a local commitment, making sure that there is opportunity for economic prosperity on an individual basis, making sure that we don't do this in a top/down way.

Herb Stein in a recent book talked about managing a budget inside of a $5 trillion economy, points to an expenditure of about a little more than 9 percent of GNP on the poor and calls even in a relatively conservative agenda for some increased expenditures on the poor.

I don't propose to you, Mr. Secretary, that I have before myself an agenda of action. I just call to your attention, in addition to the other proposals that you have here, there seems to be growing evidence in the United States that perhaps we should extract more from our gross national product and try to raise the income of those amongst us who are below the poverty guidelines.

Thank you, Madam Chair.

Senator MIKULSKI. Senator Nickles.

Senator NICKLES. Madam Chair, thank you very much.

Secretary Kemp, welcome. I congratulate you. You have been on the job, what, for 3 months and you have done an outstanding job as Secretary of Housing. You have taken your position to the field. You have met with constituents and have visited some of the housing projects that are failures. As Senator Kerrey and Senator Mikulski mentioned there are some areas that are in desperate need of more money.

HUD'S PRIOR EFFORTS NEED IMPROVEMENT

I have looked at projects where we have spent millions of dollars and have not done so wisely. I would very much like to see the money spent to help low-income Americans be well spent and not mismanaged. I am aware of some cases where millions of dollars have gone to slum lords and the conditions the people are living in are deplorable. I would really like to see that cleaned up.

I think you have taken some big steps in that direction. This committee and others in Congress will be very supportive of that effort to clean up some of the slums, which we as taxpayers have been paying for.

I look forward to working with you and to finding ways of appropriately spending the money at our disposal regardless of how much it is. I think that is vitally important.

I would also like to work with you and encourage you to assist me in changing the law or regulations if necessary. I feel tenants should be able to work in some of these projects. In many cases they are prohibited from working and doing ordinary maintenance because of regulatory restrictions, or Davis-Bacon requirements. I find this a ridiculous unjust prohibition against allowing people to help themselves. Whether it takes a statutory change or a regulatory change, I would like to make it possible for those people who live in these public housing units to be able to maintain them. By doing so we can help them elevate their status and help taxpayers save some money to restore some fiscal responsibility in these units.

So I look forward to working with you on that as well.

Thank you.

Senator **Mikulski**. Thank you very much, Senator. Thank you, Senators, for your opening statements.

Secretary Kemp, why don't you then proceed to give us your testimony?

Just by way of some ground rules, Senator, when you complete your testimony we will ask questions under the 10-minute rule for the first round and then go to 5 minutes.

SUMMARY STATEMENT

Secretary **Kemp**. Madam Chair, let me say, first of all, it is a pleasure to appear. This is my first time before your committee, and I want to thank you for not only your comments but your extraordinary graciousness and hospitality in our recent trip to Maryland, particularly into Baltimore and the chance to go to Latrobe Homes, a public housing community in Baltimore.

It is one of those visits that has given me, I think, experience—hands-on I think someone called it—and while it doesn't make me an expert, it certainly helps create that impression that I have that we can make a difference in the lives of those urban, inner city public housing residents that you have talked about and I have talked about.

And I appreciate not only the chance to visit with you in Baltimore, but a chance to be in several cities, particularly those in that part of the country in which there have been so many problems in public housing.

I do want to say, Madam Chairman, I look forward to working with you, as I have said before, and other members of this committee in not only making a difference, but in helping turn around the perceptions that nobody cares about this forgotten frontier.

That is how I look on it, as the forgotten frontier, in the sense that all too often, irrespective of party, there has been an elitist attitude toward people living in poverty, living in public housing, living in urban areas, that either we knew all the answers or we didn't care.

And I want you to know what I have tried to do in my first few weeks at HUD, or months—someone said the other day, "How long have you been at HUD?" and I said, "All day." I kind of feel that way sometimes. [Laughter.]

HUD'S PRIORITIES UNDER A NEW PRESIDENT

But as far as my appearance goes, I look forward to this. I have tried to outline what I think, Madam Chair, are the priorities of HUD under the President and under my stewardship. I have kind of generically called it recapturing the American dream for people who either feel left out or have been left out of that great dream of homeownership, affordable housing, opportunities for jobs, and economic development.

I want everyone to know that I consider it a high priority, as does the President, the idea of helping to end the tragedy of homelessness in America. It is not only a tragedy, it is scandalous that there are women or men or families living in some of these welfare motels or on the grates.

We want to empower the poor through what Don Nickles talked about and what I have seen, not only here in Washington at Kenilworth Parkside that I saw the other day, at Cabrini Green in Chicago. Everyone is familiar with George Will's article on Cabrini, in which he said it was Hobbesian. Life was nasty, brutish and, unfortunately, often short.

Unfortunately, there are those who said implode it, like we did at Pruitt-Igo a couple of years ago. I do not want to explode or implode or dynamite public housing. I think it can be recaptured from the criminal element for a lot of decent, honorable women and families and children living in public housing who deserve better. I will just say we are not going to throw up our hands and dynamite like they did at Pruitt-Igo a number of years ago.

Incidentally, at Cabrini in Chicago they have recaptured at least a third of the whole project. It is now tenant managed, tenant controlled. The tenants themselves have organized security. There is some form of identification process, and the Public Housing Authority, the CHA, just like Senator Kerrey's friend Bob Armstrong in Omaha, has been an outstanding, progressive leader in helping those residents recapture that housing, and I want you to know I am more optimistic than I was when I took the job about our ability to recapture that American dream in urban environments and public housing among the urban poor.

ENFORCE FAIR HOUSING LAWS

President Bush wants to enforce the fair housing law. That is not only a mandate from the Congress, and I know it is widely supported and there is a consensus in this country that we have got to open up fair housing opportunities for all people and of course making public housing drug free.

Those are what I have called, Madam Chair, the six elements, six agenda items for recapturing the American dream—fighting poverty in urban environments and throughout our country.

I would like, Madam Chair, to submit my testimony for the record, but there are some very important elements in that testimony I would like to share with the committee and then open it up for questions.

It is no secret, having been in the House for 18 years and now coming over to HUD in President Bush's administration, I fully appreciate much more than I ever did when I was in the House the difficulties that we have in reaching consensus, in reaching unity on not only what to do and how much money to spend, but how to reform the programs that everybody knows have been part sometimes of the problem, not just the solution.

I heard you loud and clear, Madam Chair, and heard our friend from Nebraska, Senator Kerrey, talk about moneys. We have a $5 trillion gross national product. We must remember, however, that the sole amount of money spent on urban poverty is not the Federal Government's share, as important as that may be in activating the private sector. There are trillions of dollars of monies in pensions and thrifts and banks and insurance.

What can we do to activate our tax system or incentivize our tax system to get people into low-income housing and affordability in homeownership?

So I look forward to finding all of the tools at our command that we can use to wage a new war on poverty and make it this time more successful when it comes to the urban environment and other low income people in our country.

We have begun restructuring, Madam Chair, our internal management of the programs at HUD to make sure that these priorities listed up on the chart, our long-term goals, are brought to fruition so that we can match our rhetoric with our results, our words with our accomplishments.

I have, incidentally, appointed at HUD a coordinator for each of these goals, and I want each of those men and women to develop specific recommended actions working with you, working with the Congress, working with the White House to bring about success in reaching what I consider to be these goals of unity. Maybe not unanimity, but I don't think unity requires unanimity. I think we can set out great goals and work together with our somewhat limited resources in the budget that is going forward.

HOMELESSNESS

First, the homelessness issue. As you mentioned, Madam Chair, the President has made fully funding the McKinney Act his high priority in the area of helping the homeless. I know Congress is equally interested in moving those funds to the authorized level of $746 million in fiscal year 1990, including $425 million for programs that come under our jurisdiction at HUD. Our request includes $134 million for the emergency food and shelter program, which would fully fund the authorized goal for emergency food and shelter, and we are proposing to transfer from FEMA to HUD those moneys, something we hope this committee would support.

The McKinney Act addresses a critical emergency need for shelter and supportive services that I believe you mentioned, Madam Chair. We have to go beyond the McKinney Act and to mobilize all of the resources of this country—public, private, profit, nonprofit, church, synagogue—to move those families that are now either in welfare motels or in the condition of homelessness back into the mainstream of our Nation's economic and social life.

Just as I said earlier, the Federal Government does not have a monopoly on all of the resources in our Nation. Neither has it cornered the market on ideas. In the fiscal year 1990 budget we propose a $50 million matching Federal grant with the States to help create innovative public/private partnerships that you and I talked about in Baltimore—I have talked about it in other parts of this country, as late as last week in Boston—which would help encourage and foster those promising innovative and successful local solutions that will provide not only basic shelter, but also job training, which you have expressed a strong interest in, Madam Chair, as well as permanent housing, health care, and dignity for those families and those people.

I hope the committee will support this program, and I believe we can implement it quickly without new legislation.

RESIDENT MANAGEMENT AND HOMESTEADING

A second priority I have outlined, Madam Chair, is to empower the poor, to put into the hands of poor people in this country greater opportunity to control their own destiny, their own individual lives as families as well as their communities so they, too, can begin building a future for themselves, their children.

This whole idea of homesteading and resident management is an exciting idea. It is one that I readily admit may in some parts of the country or a city not work. I think that I have traveled and talked with public housing authorities from Omaha, NE, Senator Kerrey, Bob Armstrong; in Chicago, Vince Lane; in Boston on Friday Doris Bunte, a very able and progressive Boston Municipal Housing Authority; to Ken Simmons, whom I visited in Flint with Chairman Riegle of the Senate Banking Committee.

I am convinced that there are people who want to recapture not only their communities and their neighborhoods, but also begin that process of tenant management and what I would call homesteading. Ultimately, they may even be able to own in a cooperative way that public housing.

Kenilworth Parkside is a good example, thanks to the leadership of resident groups and people all over the country who put down a stake in their public housing communities, and I think we should encourage it, incentivize it, and expand it wherever possible.

MODERNIZING PUBLIC HOUSING

Madam Chair, you mentioned modernizing public housing. Having visited Latrobe, having visited so many places in cities, I agree with you totally. Modernizing public housing, rehabilitating existing properties, bringing the stock to higher levels of not only efficiency, but also the standard—or the quality, I should say, of life and living is absolutely one of our highest priorities, and I want to suggest that whether it is LeClair or Latrobe or Cabrini or Kenilworth or Carr Square in St. Louis, I am convinced we need to work together to make these programs succeed without reducing housing assistance to low-income people.

And you have my commitment to do the very best job I can, Madam Chair, in meeting those priorities.

We at HUD continue to support sufficient funding to modernize the existing viable public housing stock, and we will do it in a way that aims at fully utilizing the potential to improve the quality of life. We want to review the Department's modernization program, with an eye toward increasing its effectiveness and finding more innovative ways to empower public housing residents.

We know there is a pipeline of about $3 to $4 billion, and my hope is that we can utilize these critical modernization funds more quickly so that that pipeline, that red tape, can get unclogged and we can move forward on these important priorities.

I want to say to Senator Nickles of Oklahoma, I particularly appreciated the point he made about the red tape and some of the obstacles that stand in the way of doing some things by the residents themselves. If we are going to modernize and rehabilitate, I would love to find a way, Senator Nickles—and I know the committee would agree—where we could use the residents themselves.

I talked with the AFL-CIO. I talked with Bob Georgine. I have talked with people who are residents, and I hope that we can reach some consensus on how we can move forward and train inner-city public housing residents to take on some of the craftsmanship that is required and the qualities of workmanship that are required in rebuilding and modernizing and rehabilitating.

So I am not going to throw up my hands in despair. I am glad to get busy and see if we can't work out some modes of operation.

Senator **Mikulski**. Mr. Secretary, do you think you could wrap up in the next 5 to 7 minutes?

You are a nonstop guy. [Laughter.]

Secretary **Kemp**. I appreciate your timeframe.

DRUGS AND PUBLIC HOUSING

So on the drug situation, Madam Chairman, I think it is very important that, as I mentioned earlier, we recapture public housing for the tenants themselves and deny access to public housing for the abusers, the dealers, the traffickers. I know I have your strong support, and I am convinced that we can do so without violating due process.

I want to be tough on drugs in public housing, but we want to be tough for due process and tough for family responsibility with regard to keeping that lease and that unit of public housing drug-free.

So there is a very strong message here to both sides of this debate, and I would hope that those who are only taking a negative look at one side or the other can recognize that we are not going to abuse the due process. There has been no place in this country where we have suspended HUD's grievance and lease procedure in which there is not due process that is assured to those who are living in public housing.

I want to commend Bob Armstrong in Omaha once again, Senator Kerrey, as well as Vince Lane in Chicago, whom I think are both models, paradigms, that can be emulated in other parts of the country.

Winning the war on poverty means housing affordability, and it means jobs.

ENTERPRISE ZONES

Madam Chair, I am so particularly pleased today that you mentioned enterprise zones. It isn't the only tool, but it is a very important tool, and I hope the Congress will move swiftly on the idea of putting some dramatic incentives into the inner city economy for entrepreneurship among minorities, women.

I think we ought to have as an action goal expanding by two or three times the number of minority enterprises in America in the next several years, and of course that includes women and Hispanic and Asian and African-American communities. Nothing would give people more hope than to show this Nation's small business community that we want to work with them to expand entrepreneurial opportunities for minority men and women throughout this country, and particularly in the urban environment.

There are over 200 cosponsors, I heard last, of the Rangel-Garcia bill in the House, and you, Madam Chair, have mentioned supportive efforts. Senator Cranston and many other Members on both sides of the aisle are particularly pleased at the opportunity to pass urban enterprise zones for the country.

Affordability of housing and homeownership. I would hope we could work together on reforming FHA to find ways, either through the tax system or FHA reform or using IRAs and Keogh accounts and other innovative ways, to expand opportunities for homeownership, particularly among those first-time home buyers. There have been several bills in the Congress, and we are looking forward to working with this Congress to find ways of expanding homeownership not only for low-income people but also for the first-time home buyer.

INCREMENTAL VOUCHER PROGRAM

I would be remiss if I didn't mention our request for enactment of the 109,000-unit incremental program of vouchers for fiscal year 1990. I have told many people, Madam Chair, including yourself, I don't expect to be the Secretary of Vouchers. I want to be a Secretary of Housing and Economic Development. But vouchers can play a role in providing consumers, low-income people, with the type of choice and dignity that goes along with giving them affordability, giving them opportunity, giving them choice.

I would hope that this committee would look favorably upon my request for a 109,000-unit incremental program for fiscal year 1990.

One last word, Madam Chair, is that I do want to use the Tax Code. There is a debate that has been raging ever since the early 1980s on whether the Tax Code should be used for socially desirable goals. I believe it can be, has been, and should be. Homeownership is a socially desirable goal. Economic development is a socially desirable goal. Building house, affordable homeownership, and housing opportunities for low-income people is a socially desirable goal, and I hope a very promising task force entertained by both Senator Mitchell as well as Senator Danforth can be used to broaden and expand and reform our incentives in the Tax Code for building low-income housing in the single- and multi-family area.

FAIR HOUSING

I mentioned fair housing. I don't know that there is an issue other than fighting homelessness upon which more people, left, right, and center, agree, to make sure that we finally bring to fruition the goal of this country to have fair, open housing and opportunities for fair housing to all people irrespective of their race or national origin or whatever difference that they may have in our society.

The President is committed to that. I know you are, Madam Chair. I am particularly pleased that the home builders, the realtors, the private sector, and the public sector are convinced that we need to move forward on this consensus.

PREPARED STATEMENT

You have my budget request, and I just want to thank you for the hospitality. I apologize for taking a little bit longer, but I think it is important to get these very important points on the record.

[The statement follows:]

STATEMENT OF JACK KEMP

Madam Chair, Senator Garn and members of the Committee, I am very pleased to be able to appear before you today to present my 1990 Budget request, the first Bush Administration budget request for the Department of Housing and Urban Development.

And, Madam Chair, I want to thank you again for your courteous and informative hospitality in Baltimore. Such first-hand insights into urban problems and local solutions are extremely helpful in the continuing development of policy at HUD. They enable me to keep uppermost in my mind the personal impact our programs and budgets have on our fellow citizens.

Having served on the House Appropriations Committee, I fully appreciate the difficulties you face in meeting the conflicting demands of appropriating sufficient funds to meet our critical domestic needs while at the same time helping to control the budget deficit.

At the outset of my working relationship with the Committee, I want to say that unity does not require unanimity. We may not always agree on methods, but we can agree on the important goals of jobs, housing, homeownership, and opportunity for all as integral parts of the American dream. We must recapture this dream for the people who live in poverty and despair in our cities and rural areas. Meeting their urgent needs requires close cooperation of the Congress, the Administration and everyone who cares about the plight of our fellow human beings.

A commitment to help the poor reinforces my determination to assure that all HUD programs operate without favoritism, and for the fullest possible benefit of those in need. I will not tolerate abuse of our programs, nor awards made on any basis other than need.

Our programs will be administered consistent with statutory requirements, ethically and efficiently, for their legitimate purpose. That goes for Section 8 Moderate Rehabilitation and every HUD program.

We want to use the full resources of the Department of Housing and Urban Development to wage war on poverty. Yet, the Federal Government cannot and should not wage this war alone. In addition to Federal and other Governmental efforts, there is great potential for private sector entrepreneurs and neighborhood self-help organizations to provide new opportunities for all Americans. And we must measure our success in this war on poverty, not by the number of people who use Government housing programs, but by the number who do not need Government assistance because they have adequate private sector jobs, have decent housing, have income and opportunity to own their own home.

President George Bush and I have laid out six priorities for my stewardship at HUD:

- -- a commitment to help end homelessness, particularly for families with children;
- -- empowering the poor to control their own lives through initiatives such as resident management and ownership of public housing;
- -- promoting a drug-free America, particularly in HUD supported housing;
- -- jobs and economic development through Enterprise Zones to encourage entrepreneurship in distressed inner cities and rural areas;
- -- maintaining the supply and availability of low-income housing and recapturing the American dream of homeownership by making housing more affordable for first-time homebuyers; and,
- -- fully enforcing the new Fair Housing law, by providing the needed resources for timely and effective investigation and resolution of all fair housing complaints.

We have already begun restructuring our internal management of programs to make sure these priorities--our long-term goals--are brought to fruition and my words are matched with accomplishments. I have appointed a coordinator for each goal to develop specific recommended actions and to keep me apprised of our success in reaching these priorities.

All of our priorities have budget implications. We have already proposed amendments to the January 9 Budget to provide more funding for the homeless and homeownership and to withdraw the proposed rescissions for the Nehemiah and UDAG programs. As we consider our priorities, we need to be sure we are using our resources to support them. While it is true that our funds are limited--and we are all subject to the same budget arithmetic--we will not pull back from our ideas just because of that fact. It is the challenge facing all of us to make limited resources go further.

To meet our goals, we must develop a consensus and energize all the available resources--public and private, profit and non-profit--at our command to achieve our common purpose. Today, I will address each of these priorities and indicate how they relate to our Budget request.

First, the Homeless. This Committee appropriated funds for the McKinney Act in the last Congress. President Bush is committed to the full funding of that Act, and I will implement it with vigor. The President's Budget fulfills his pledge to fully fund the McKinney Act in 1990 at the authorized level of $746 million, including $425 million for programs under HUD's jurisdiction. This request includes $134 million for the Emergency Food and Shelter program which we are proposing to transfer from FEMA to HUD, a proposal which we hope the Committee will support.

The McKinney Act addresses a critical emergency need for shelter and supportive services. But we must go beyond McKinney and mobilize all resources of the Nation--Federal, State, local and private--to move families back into the mainstream of the economy.

Just as the Federal Government does not have a monopoly on resources, neither has it cornered the market on ideas. In the 1990 Budget we have proposed a new $50 million matching grant program to help create innovative public/private partnerships to address many facets of homelessness. This new program, operated out of the Secretary's CDBG Discretionary Fund, will help encourage and foster the most promising innovative and successful local solutions that provide not only basic shelter, but also jobs, permanent housing, health care and dignity. I hope the Committee will support this program, which we can implement quickly without new legislation.

I also want to assure this Committee that we are taking aggressive efforts to revitalize the Interagency Council on the Homeless. As Chairman of that Council, I feel strongly that my responsibilities for administering the McKinney Act go beyond my responsibilities at HUD and encompass the broad scope of all the Federal Government's activities. The Council will actively assist communities and non-profit groups to meet the basic shelter and service needs of the homeless and provide them, as well, with the opportunity to move permanently into the social and economic mainstream.

A second priority is to empower the poor to take control of their communities, so they can begin building a future for themselves and their children through homesteading and resident management. Kenilworth/Parkside here in Washington shows how resident management and ownership empowers the poor and redirects an entire community's future. Thanks to the leadership of resident groups, people all over the country have put down a stake in the community through management and ownership of their homes.

We need to encourage such self-determination wherever possible. And it is possible. I recently visited Chicago. Together with tenant leaders like Irene Johnson, we cut the ribbon and turned LeClaire Courts over to tenant managers. We then visited Cabrini-Green a symbol of past despair, and witnessed first hand how that community is being turned around by tenant management. They represent the progress we have made toward facilitating resident management and homeownership around the Nation. I will work with Congress to make these programs succeed without reducing housing assistance to low income people.

We continue to support sufficient funding to modernize existing viable public housing stock and will do it in a way that aims at fully utilizing its potential to improve the quality of life for its residents. We are reviewing the Department's modernization program with an eye toward increasing increasing its effectiveness and finding innovative ways to empower public housing residents. We are seeking ways to utilize these critical modernization funds more quickly so we can unclog a pipeline of about $4 billion.

The third priority concerns the Nation's drug epidemic. We will deny public housing access to drug abusers and drug dealers, so public housing residents can maintain a decent living environment. I have already sought the full cooperation of some 3,000 public housing authorities in this war on drugs. I know that Congress feels as strongly about this as we do, and we applaud current Congressional action to provide additional public housing operating subsidies for, among other things, initiatives to combat drugs in public housing. We'll use this money to implement local programs such as Vince Lane's "clean sweep" in Chicago, to send a message to individuals who abuse the privilege of public housing.

I intend to be a leader in these and other efforts to promote a drug-free America. We will work closely with Federal, State, local and private leaders and continue to work with Congress, to develop strategies for fighting drug problems affecting HUD program recipients.

Recently, we waived HUD's Lease and Grievance procedures in favor of prompt and fair circuit court hearings for Virginia public housing residents engaged in drug and drug-related activity. I have also asked my General Counsel to immediately prepare regulations to permit termination of Section 8 certificates and vouchers of persons who engage in similar conduct in subsidized private housing. Even before those regulations are prepared, we are urging PHAs to terminate such assistance where drug activity is occurring within a unit. Drug dealers and abusers have no place in public housing...nor anywhere in our communities.

What does have a place throughout our communities...and especially where conditions are worst...is opportunity. If we are to purge the plague of drugs...if we are to plant the seed of hope...then we must pursue economic opportunity for all.

Winning the war on poverty hinges on our fourth challenge, job creation and economic development. And, that's why I believe so strongly in the need for Federal Enterprise Zone legislation.

Enterprise zones remove barriers to investment and entrepreneurship in our distressed inner cities and help unleash the power of free enterprise. President Bush has said he believes in a Government that sees economic empowerment of individual Americans as the key to future economic prosperity.

We need to encourage job creation and entrepreneurial activity in those areas that have been left behind by our national macroeconomic recovery that has generated close to 19 million new jobs in a little more than 7 years.

Enterprise zones are a full-scale assault on poverty and despair in our cities and rural communities. By providing meaningful tax incentives to entrepreneurs, and the individuals who invest in their ideas, enterprise zones will expand minority businessmen and will turn redlined inner cities and rural areas into income-producing and Federal revenue-producing greenlined areas.

There is great enthusiasm and bipartisan support for S. 58 and its companion bill H.R. 6. I share this enthusiasm and we will be working with the Congress in the next few months to develop the most effective enterprise legislation possible.

The tax revenue we invest initially will be more than offset with revenue gains as businesses achieve successes in enterprise zones. In addition, as enterprise zones succeed, the unemployed will become employed and will no longer need the government support they now receive. The time is right for passage of the needed Federal tax incentives for enterprise zones--urban and rural.

I also believe that the Community Development Block Grant program can be used as an economic development tool for our cities, counties and States. This program is particularly valuable in its contribution to housing rehabilitation and other activities which directly benefit low-income families. I would like to explore with this Committee how to better target these economic development funds to low-income people and distressed areas of America whether urban or rural. In 1990, we are requesting a total of $2,880 million for CDBG--the same amount as was appropriated in 1988.

A fifth priority is to make housing more affordable and to increase homeownership...the crucial component of the American dream. President Bush has said our task for the next decade is to see that all Americans, especially young Americans, can find the homes and stable communities they need to build their lives and families. More than 18 million Americans have become homeowners because of FHA insurance. In 1987, Congress made certain that FHA's key insurance programs would exist permanently, and I will continue my strong support of FHA's basic mission.

FHA provides homeownership opportunity to young families, but homeownership has declined among them recently, and we want to help reverse that trend. FHA's basic mission is to put homeownership within the reach of as many Americans as possible without compromising the integrity and solvency of the FHA Fund.

Correspondingly, we are considering changes to FHA to better serve first-time homebuyers, particularly in high-cost areas. I am aware that several bills have been introduced which present other options, including the use of tax free retirement savings accounts such as IRA's and I look forward to working with Congress to bring the best of them to fruition. But no matter what we do, let's make sure that State and local governments do not inhibit the availability of housing. In that connection, we intend to study the barriers to availability of affordable housing to pinpoint the problems and propose solutions.

While FHA serves a more traditional market of homebuyers, Madam Chair, there are lower income families pursuing the American dream of homeownership. In that connection, we are proposing a special $44 million fund in the Community Development Block Grant program to support innovative approaches to homeownership for lower income families. This program will be operated out of the Secretary's Discretionary Fund, and in my view will be a pilot program to pave the way to new ways of incentivizing homeownership for low-income families.

It is essential to make housing more affordable for homebuyers. It is equally important to make rental housing affordable and available to those families who need rental housing assistance.

The Voucher program is a tool for increasing housing opportunity and low-income assistance. But we also want to know how vouchers can be better used, or how the Assisted Housing program can be improved generally. The program's basic purpose is to ensure that poor families have access to decent housing. Of course, my mind is open to other ideas as well. If there are better ways to help families move into jobs, and economic opportunities that will enable them to find and afford unassisted housing, then we will pursue those opportunities.

The goal of the Bush Administration is to expand the availability of housing for low-income and elderly individuals, and those with special needs. The needs are greater than the Budget for one fiscal year can handle. The first step, however, is to secure enactment of the 109,000-unit incremental program for 1990. Within available resources we will look at other options, including more effective use of available tax incentives and better use of public-private partnerships to expand low-income housing opportunities.

In addition to increasing the number of families we assist, we also must deal with situations affected by prepayments, property sales or other activities which may contribute to displacement. This is an issue of major concern to me. I stated during my confirmation hearing and have continually reaffirmed since that I will not permit any currently low-income family to become homeless as a result of these activities.

It is vital that Congress and HUD work together to develop a responsible approach to housing preservation. But it is equally important for us in Washington to seek the advice of the residents who will be affected by prepayments and opt-outs. We've got to be able to look at individual projects to know whether opportunities exist for resident management or homeownership, or whether vouchers might be the best solution.

I believe the Tax Code can be used as a means to induce the private sector to invest in building and preserving housing for low-income families. I support the Low-Income Housing Tax Credit as a preservation tool and am looking at the recommendations of Senators Mitchell and Danforth and others, to determine how to improve it. There may be other tools that the Tax Code can provide, Madam Chair, and we need to consider all of them. HUD must be given adequate flexibility to use whatever means are developed, so we can deal effectively with the variety of conditions presented for individual prepayment and preservation needs.

Further, we are committed to protecting families in need who already receive housing assistance through the Section 8 program. Our Budget proposes renewing almost 24,000 contracts which expire in 1990; in the out-years, we will continue funding contract renewals and incremental assistance until our critical housing needs are met.

Finally, Fair Housing. The creation of new housing opportunities means little if housing opportunity is not equal for all...if any individual or family faces discrimination because of race, age, religious belief, ethnic origin, disability or family status.

We have already begun to implement the Fair Housing Amendments Act of 1988 and will enforce it with vigor. For instance, on April 20th, I directed the Department of Justice to seek a temporary restraining order to keep available an apartment for a family with four children. This was the first case involving a temporary restraining order under these amendments, and we will continue to take similar actions whenever they are required.

I also intend to see that public housing authorities follow tenant selection procedures that do not discriminate or lead to desegregation. I have ordered a review of tenant selection and assignment procedures of the Nation's PHAs to ensure that this is the case, and to correct the situation where it is not. The first action was taken in my home town of Buffalo, where HUD determined the housing authority's tenant selection procedures were violating Title VI of the Civil Rights Act, and we are working with the city to fix this problem.

I also welcome this opportunity, Madam Chair, to urge you and the Committee to support the $3.5 million supplemental appropriation we propose to increase Fair Housing Enforcement staff. We look forward to its enactment.

Our total 1990 Budget request is for $14.8 billion in budget authority. Outlays are estimated at $20.2 billion in 1990. If Credit Reform legislation is enacted, an additional $2.3 billion in budget authority would be required. We are requesting 13,215 staff years.

Members of the Committee, we face both immediate and long-term budget challenges. Just as America has been blessed, it has an obligation to be a blessing to those less fortunate. We must work together to help them, remembering at all times that the total solution is not within the power of the Federal Government alone. We must energize the private sector, State and local governments, and poor families themselves to reach the common goal.

I look forward to responding to your questions and to working with you in the weeks and months ahead.

BUDGET REQUEST

Senator MIKULSKI. Sure, you took long. I like the fact that you are here in person. Your predecessor at times did not come.

I like the fact that you have here a set of goals and priorities that are focused on poor people and working poor people and people who don't want to be poor.

So anybody who is going to take half an hour to outline that has this committee's attention.

Let's go to the budget. This increase that you talk about in your budget, which is about $284 million, is still considerably less than Carla Hills had in her last year as HUD Secretary.

Mr. Secretary, what do you think HUD really needs for fiscal 1990, and what was the budget estimate of OMB before it was trimmed to come to us?

Secretary KEMP. I would be less than candid, Madam Chair, if I didn't say that I strongly support the budget that I am presenting. We are in a period in which there has been an agreement between OMB, the White House, Congress, and key legislators that has been carefully crafted.

It isn't all things to all people because it has been criticized on both sides of the philosophical aisle, but I would suggest that it is at least the beginning of a process by which we can move forward and see if we can't find some more innovative ways of doing some of the things that heretofore some people felt only the Federal Government could do.

So one area that I talked about is in drugs. My hope is that a fully funded, at least $8.5 billion antidrug effort in public housing would help use the money for the very legitimate purpose of modernizing and rehabilitating.

As I told you earlier, there is $3 billion in the pipeline. I hope to unclog that, and it may be that Congress wants more money in CIAP. I can imagine that modernizing and rehabilitating our existing stock is a very important goal, and I would hope to reach a consensus with this committee.

HUD'S EFFORTS AGAINST DRUGS IN PUBLIC HOUSING

Senator MIKULSKI. Let's then pick up on public housing.

First of all, I commend you, as I know other members of the committee do, for your aggressive stand in getting rid of public housing projects' illegal drug use. As I say, those projects shouldn't be small business incubators for drug dealers.

The House Appropriations Committee has included $8 million in the 1989 supplemental to begin HUD's work in this area.

What is your position on including these funds in the supplemental, and how would you—and the House language limits the use of these funds for security assistance—how do you feel about putting in a supplemental and what would your reaction be if the Senate supported that, adding language which would target the funds to those projects with the highest drug problems?

Secretary **KEMP**. Well, if I understand your question, I would answer it by saying that I strongly support the $8 million for combatting drugs in public housing. The efforts to bring public housing residents more security is essential. I don't think anybody would disagree that the funds ought to be flexible enough to do some of the innovative things that are being done in Omaha and Chicago and other parts of our country, but just so they don't tie our hands so tightly that we have so little flexibility that we can't define security in a way in which people really are secure.

I don't want to put up bars to public housing, and I want to assure you, Madam Chair, I am not interested in putting up a fence around every public housing project. It may be there are areas that may need some type of a fence and we could look at it on a case-by-case basis, but I want you to know I would look at public housing antidrug efforts in as flexible a way as the goal of what you would like to do, to make sure that they are not incubators for crime.

Senator **MIKULSKI**. Mr. Secretary, the House just added their language late Friday, and we would really encourage a careful analysis by your Department of what you think that language is.

First of all, we support you having flexibility. We also think it ought to accomplish the most good in the quickest way possible. So we would like your comments on their language as we work at it.

Secretary **KEMP**. I will get you an answer.

HUD'S PLANS FOR DRUG SITUATIONS

Senator **MIKULSKI**. Would you comment in more detail on what your plans are for dealing with the drug situation in public housing? Have you done, for example, surveys of public housing authorities of what they would like to do and how this ties in with the modernization of public housing?

Secretary **KEMP**. First of all, I think they are inextricably linked together. You can't talk about modernizing public housing in America today and not articulate a concern with the very serious problem of this criminal element that has crept in over the last few years into public housing.

I don't need to tell you that it was in a public housing project in Philadelphia where I first encountered the type of illicit capitalism you alluded to in your opening statement, and frankly it is the residents themselves, Madam Chair, as you so well know, that are just not only begging but demanding that you and I agree, together with the PHAs, to do something to help recapture the public housing for the residents. They are decent and hard working and, in the main, law abiding.

I have asked our PHA's around the country to give me their own experiences what they would suggest. I have tried to work with PHA's. I sent out a letter to 3,300 PHA's. They have responded, at least well over a third have, and some of the ideas that I have gotten, Madam Chair, have come from people like Bob Armstrong in Omaha and Vince Lane in Chicago. We have asked them to tell us what they are doing to tighten up on the eviction procedure, where there was due process ensured, as in Alexandria and I think in Boston. We have removed HUD's lease and grievance procedure, from the process so that there would be better cooperative efforts to remove these people from their leases on a case-by-case basis. The courts have to deal with some of the vexing problems of what you do with families, but I want to assure everybody that while we want to be, as I said earlier, tough on drugs, we also want to be tough for due process.

We have suggested several security measures. It does not include putting up big fences or iron bars. We don't want to turn them into a prison, but we do want to make sure that there is some form of identification that should be required of someone. We have suggested that the PHA's, by publishing the notices, that a lease must include an explicit provision that allows termination of tenancy if any member of the household or person under the tenant's control, active control, engages in a drug-related criminal activity.

REGULATIONS REVIEW TO COMBAT DRUG-RELATED ACTIVITY

I have also made no secret, Madam Chair, of trying to change regulations or the law with regard to the section 8 subsidy, so that no person who is thrown out of one public housing project because of drug-related activity then can use that subsidy to go off into another public housing environment.

I think the most important thing that I can suggest is to work with the tenants and work with the tenant organizations, work with the PHA's and come to some agreement on a case-by-case basis in the public housing communities themselves rather than having it imposed.

There's many things we can do working together, but I would like to encourage tenant management, tenant controls, bringing the tenants themselves into this process because they are the ones who are most interested. They need our help, and we need more onsite presence of the police as I suggested in Flint.

People applaud it, and it just kind of came off the top of my head that maybe in certain circumstances it may be necessary to allow the police an opportunity to live in public housing so there is some presence in the community of a figure of authority.

I don't know that that is the right way to do it, but I certainly would like to explore that possibility with our PHAs and the local mayors.

Senator MIKULSKI. What you are saying is there are certain basic tools that you need. One is modernization for public housing.

Secretary KEMP. That is a key antidrug effort.

Senator MIKULSKI. Let me get to the question.

Funding for the modernization of public housing and flexibility that modernization would include security just like it does in the private sector?

Secretary **Kemp**. Yes.

Senator **Mikulski**. When anyone is upgrading their apartments, they are adding new security measures.

PERFORMANCE FUNDING SYSTEM

The other is I understand HUD computes the level of operating subsidies with public housing by something called the performance funding system.

My question—and perhaps this needs to be answered for the record—does the PFS reflect the higher cost in dealing with drug-related problems? In other words, as you compute what is needed, is the system we are using a contemporary one that understands what public housing authorities are operating under?

Secretary **Kemp**. It doesn't, Madam Chairman.

I am going to ask Al Kliman, whom this committee is very familiar with, to develop that a little further.

Senator **Mikulski**. Mr. Kliman is an old hand. We welcome his expertise.

Mr. **Kliman**. Thank you, Madam Chair.

The performance funding system, as the Secretary said, does not recognize in every case the updated requirements. Back in 1976, I believe it was, when we started the performance funding system, if a PHA had security procedures in its base. It still has it in its base. If a PHA did not have it in its base, it does not have it now.

The only real adjustment that has been made are those for inflation as well as certain legislative changes, such as insurance.

Senator **Mikulski**. So what needs to be done, Mr. Kliman? Should we do that?

I mean, the presence of drugs is adding to the cost of doing business for public housing authorities.

Mr. **Kliman**. That is correct. I would think, as the Secretary said, we will be looking at the performance funding system with an eye to determining whether or not additional changes should be made.

Senator **Mikulski**. I think we would like very much for you to do that, and also I happen to think that if local public housing authorities are moving to capacity building among tenants along the lines that the Secretary has outlined, I think that ought to be recognized and rewarded.

We are putting a lot of bucks into dealing with the bad guys who are ruining public housing. Let's make sure that there is also good guy, if you will, bonuses where capacity building is going on, the groundwork for what we would hope is either tenant management or tenant ownership. We know that the tenants don't assume that responsibility without some type of process for capacity building, and we know on your staff you have had people caps.

That is why I wonder if we can look at the PFS system where there can be recognition of the increased cost of doing business with drugs, but again having good guy bonuses.

Secretary **Kemp**. Thank you for the suggestion, and we would like to elaborate on this for the record.

[The information follows:]

Updating of the Performance Funding System

The level of funding for protective services under the Performance Funding System [PFS] was about $34 million in 1975, the PFS base year. This level has been increased annually by inflation and in fiscal year 1988 the PFS funded about $80 million in protective services.

Protective services includes salaries and wages for PHA personnel and tenants engaged as project police, guards, and watchmen. It also includes the costs for contracts with tenant organizations, municipal entities, and private security services for providing protective services. Costs for uniforms, electronic detection equipment and devices, alarm systems, communications equipment, and vehicles used for providing protective services are also included in this category of expenditure.

The Housing and Community Development Act of 1987 directs that the PFS be amended to provide a formal review process for making revisions to the Allowable Expense Levels [AEL's] of PHA's. One of the bases for these revisions is to accurately reflect changes in operating circumstances since the initial determination of the base year expense level. An increased need for protective services would be one example of changed operating circumstaces. With the exception of an adjustment for increased insurance costs in fiscal year 1989 and the annual adjustment for inflation and changes in PHA units, these formal reviews will afford the Department its first opportunity to adjust AELs since the PFS base-year.

BALTIMORE'S SUCCESS STORY IN DRUG-FREE PUBLIC HOUSING

Secretary **Kemp**. I remind you, Madam Chair, that you and I saw firsthand what the folks were doing in Baltimore, and I keep pointing to Kenilworth Parkside, but it is drug free. It is an amazing success story that can be implemented, and they should be rewarded for that, not punished by any lack of effort on our part.

So we plan to encourage people that have given us a good idea to expand on that.

Senator **Mikulski**. Senator Grassley.

Senator **Grassley**. First of all, I want to thank you for coming here today, particularly coming with a well-thought out program, point by point, and particularly as I look down at this, two or three points would not be there had it not been for your energetic leadership over the last several years. I think particularly of enterprise zones, but I think the one that we ought to be most thankful to you for is your efforts to make public housing drug free.

It is just one of the many legs on the stool which we are going to have to have if we are going to get drugs under control.

I know by working together, as you and I have had an opportunity to do in your years in Congress, that your leadership at the Department will allow for a new fresh approach to our housing problems that we face today. The cooperation I have already experienced with your agency has been helpful in my State. So I look forward to continuing to work closely with you throughout your tenure at HUD.

CONCERNS WITH ENTERPRIZE ZONES

I want to explore a couple of areas with you regarding concerns that I have with some of the programs at HUD.

One of the programs is the enterprise zones that you have talked about, not just now, although I remember your visiting about this throughout your many visits to Iowa over the last few years.

My question is when you talk about enterprise zones, what do you see happening for rural communities, and how do you see the zones working there?

Secretary **Kemp**. First of all, Senator, early on in the consensus that began to be shaped over enterprise zones, in working with people like Bob Garcia, Charlie Rangel, and yourself and the conservative opportunity society, I think we all recognized that we would have to have a bill that met the needs not only of urban America or began to meet those needs, but also had an attraction to the rural parts of America, and as we began to shape this consensus I think it is probably one of the most unique bipartisan coalitions in the country today.

We early on—I would say back in 1980 Bob Garcia and I first introduced—we distributed zones, in the bill anyway, almost the same as the CDBG monies. About 25 percent to 30 percent, one-third of the zones, were to go to rural communities in the country and two-thirds to urban areas, pockets of poverty in which there was so much distress, and objective criteria that could be defined in the following terms—lost population or a shrinking tax base or levels of unemployment or number of welfare or CETA eligible employees. A number of those criteria were introduced—I won't say too subjective, but we did want to introduce an element into the process by which communities would have to compete for the zone. So they could take a look at what barriers they were placing in front of small businessmen and women, recognizing that small business is responsible for about 90 percent of all the new jobs created in the United States for about 6 or 7 years, or at least businesses with less than 120 employees.

So I would imagine the rough consensus was about a third were designated for rural areas, including Indian reservations, which had been introduced by Senator McCain of Arizona.

So that was the rough distribution, and how the actual line is drawn, which we envision to be a green line around these areas, would be subject to the community working at the State level on fulfilling those criteria that would be judged by HUD or the administration and the Congress to be worthy of this extraordinarily dramatic reduction in tax rates on labor; that is, the employee, the investment capital, the venture capital, as well as the people who invest in the equity or the debenture of that enterprise zone business.

Senator **Grassley**. The theory then is that in rural areas it works the same as in urban areas?

Secretary **Kemp**. That it would work the same, but that there would be a distribution of about one-third/two-thirds, like CDBG roughly, and that you couldn't draw a whole area statewide or something, but governors, mayors, and community leaders begin to see those areas that were heretofore, say, red lined deserved green line status, that they would qualify even in rural and other parts of the country.

Senator **Grassley**. Thank you.

HOUSING FOR THE ELDERLY AND HANDICAPPED

I want to visit about section 202 housing for the elderly and handicapped, and I want to refer to Monday, January 9, when HUD sent its proposed 1990 budget. In its news release I noted that the agency talked about elimination of the nonmetropolitan quotas for the section 202 programs. I would like to have you explain the proposed changes and why the need for the proposed changes.

Secretary **KEMP**. The division of the monies into construction of 202 housing for the elderly and the handicapped—and when it got to certain States the pot had been diminished by that division plus trying to find a way to distribute it to the various States—it was almost an impractical thing to try to keep the original split. So we argued for some more flexibility, or at least maximum flexibility so that the rural proposals for 202 housing construction for either handicapped or elderly would have—so that areas that were rural or States that were more rural would have a broader opportunity to compete for those somewhat limited funds.

So it was in our view at HUD a desire to do better by those States and those communities and giving us more flexibility with which to designate that type of housing because we were afraid—I mean, if we just had a strict, narrow interpretation, I would say to my friend from Iowa, the monies would be so spread out that it would literally preclude many areas in the gentleman's State or the State of Oklahoma or Nebraska.

Senator **GRASSLEY**. Mr. Secretary, I think that the next two questions I have are fairly narrow, and I will ask for answers in writing.

Secretary **KEMP**. All right.

Senator **GRASSLEY**. Madam Chair, I have completed.

Senator **MIKULSKI**. Well, thank you, Senator.

Senator Kerrey.

FEEDBACK ON USE OF VOUCHERS

Senator **KERREY**. Mr. Secretary, just so you can get some feedback on your testimony, I will tell you that in Nebraska the vouchers—apparently for the reason that we have got a market with some vacancy in rentals, the vouchers appeared to work rather well for us.

I am inclined as well, second, to support your request for increased discretionary authority so you can supply some CDBG efforts to the problem of homelessness. I must tell you—this perhaps does not come as any surprise to you to hear—that one of the things that concerns me, with the homeless in particular, is there is a tendency that all of us have—and certainly I should just say it myself—to try to get something done with the homeless so I can get it on my campaign brochure the next time I face election and not worry about whether or not it is doing any good.

CDBG EFFORTS

I would call to your attention a couple of efforts in my home State that were largely community driven that appeared in the area of CDBG's to work, and as long as I am now supporting your work I would just call these to your attention for your consideration.

One is in the area of rural development where, as the number of entitlement cities increased, we are concerned that the number, the amount of total dollars in CDBG money available for rural communities will actually end up decreasing.

I would call to your attention that what has happened as the money has been driven more to the local level and indeed does to the governor's, that many of these CDBG monies have worked exceptionally well for rural economic development, and there's all kinds of examples where they have been matched by local commitments, matched by State commitments. I simply call that to your attention.

Second, I call to your attention a couple of projects that Bob Armstrong and I would be working with. One is the project on infant mortality. Again, I don't need to go into the numbers with you. I trust you are familiar with what the evidence shows there. We believe in the project itself we might find a population with whom we could work rather easily to actually get some measurable change over a 15 to 20-year period.

The second thing, inside the project itself, that we will be coming to you on is to try to work—in your testimony you indicate that you consider that you have got somewhat broader authority in certain areas. One of the things that we find at the State level is in the area of public housing, particularly where it is a project, you will find people inside the projects who will be recipients of Medicaid, recipients of food stamps, and recipients of a number of other programs.

One of the things that we would like, that we are working on, that we are going to come and talk to you about is the possibility of developing something where we might get a waiver to do something—in general, something that would give us sort of one-stop shopping and the possibility of actually doing something that I really like in your opening testimony, which is the willingness to measure whether or not we are doing any good.

Secretary **Kemp**. Right.

Senator **Kerrey**. I would sort of parenthetically point out again—and I am very much aware that in order to make progress one thing a person has got to have is income. I am alarmed as I look at the aggregate data at the amount of money that we extract—we extract about 1.29 percent of our Gross National Product for approximately 14 percent of our population that falls below the Federal poverty guideline. That number appears to be trending down, although not much. It certainly is not increasing.

I think we are going to have to give some consideration within the context of not wanting to throw money at the problem to that income effort.

Secretary **Kemp**. Correct.

DIRECTION OF HOUSING AUTHORITY EFFORTS

Senator **Kerrey**. Two very specific questions. One is how do you evaluate the tradeoffs that are there, the conflict that is there between what I understand is both a congressional and a HUD-mandated effort to direct the housing authority effort, in particular, toward the poorest of the poor? How do you resolve the conflict that appears to be there with housing authority folks that are trying to assist not just the poorest of the poor, but those that are sort of on the edge of moving out of the projects?

Sometimes it seems to me that these people are faced with a rather difficult conflict where they are underserving people who also not only have needs, but are making the greatest effort to get out of the projects.

Have you spent any time looking at that?

Secretary KEMP. When you say "the projects," are you talking, Senator Kerrey, about a person in public housing?

Senator KERREY. Yes, I am.

Secretary KEMP. I would consider—maybe I am not answering the question with the specificity that you asked, at least as I hear it—I would think that someone living in public housing is a priori targeted for special help. I mean they are deserving—raising the standards of living, the quality of life, bringing the units that are vacant up to higher standards, bringing them out of vacancy into use. I think that is an important part of this whole antidrug effort. Rehabilitating, modernizing, as Senator Mikulski talked about earlier.

When I talk about targeting monies and targeting ideas, it was through enterprise zones, targeted on poor communities. At CDBG we were talking about making sure that eligible activities were things like housing for the poor, the infrastructure of poor neighborhoods and poor communities, making sure that our scarce resources were spent in a way that goes directly to helping the poor community or specifically a poor person, even if they are at the edge of that level of poverty you alluded to in your question.

So I think there are some definable criteria that can be used, and we may make some mistakes, but I have tried to say at HUD that where our resources are being targeted they get to the communities, the neighborhoods, the families, and the people themselves, in as direct a fashion as possible to help give them the boost up with which they can lift themselves.

Wow, was that a tortured metaphor. [Laughter.]

WELFARE SYSTEM TRAP IN PUBLIC HOUSING

Senator KERREY. Specifically, if I am running a housing authority, I expect to get 97 percent PFSL allocation or somewhere in that allocation. So I am looking for other sources of revenue to build a budget, and what I have got is a spectrum of individuals living in what we referred to, not in a pejorative way, as the projects and the spectrum of individuals, the poorest of the poor who can pay nothing up to some individuals at the other end who are about ready to move out, who could pay something, and if I come to you and hammer you and say we have got to take care of the poorest of the poor, what I find is that at the local level it seems to me the impact ends up being that the people who are working, who are trying to move out of the project end up suffering as a consequence.

Secretary **Kemp**. Your question really, Senator, is a broadly based question, and it has profound implications for the whole welfare trap or poverty trap into which some people have been caught up, because the way the system works, as you improve your own ability to earn income for your family there is a reduction of welfare benefits or targeted assistance of one sort or another, and, of course, you enter the tax stream and you get taxed on the other hand, and I have seen certain communities—Barbara is nodding her head because she knows that some women with two or three children on welfare find a disincentive to get a job, almost overwhelming, because they can find themselves 120 percent marginal tax bracket combined with a loss of welfare benefits.

I saw the article in the Omaha, NE, newspapers about Bob Armstrong telling people that his whole goal as a public housing administrator in Omaha was to get people out of public housing and get them into the mainstream of the economy and up the social ladder of opportunity that we call the American dream.

How we do that is something that you and I, this administration, Senator Moynihan and some very, very interested people have got to find some answers to because right now there is a trap in our welfare system, in our public assistance system.

RESIDENT MANAGEMENT AND TENANT OWNERSHIP

Senator **Kerrey**. How far do you intend to push or how strongly do you believe in the resident-managed or resident-owned system? Do you intend to push it against local resistance to do it, or do you intend to just support it where the locals have indicated they would like to try it?

Secretary **Kemp**. I wouldn't push it against the residents themselves, but if a PHA is opposed, I would certainly want to talk to that individual man or woman who heads up the PHA. Some PHA's are very, very progressive and positive with regard to tenant management and ownership.

I met Doris Bunte up in Boston last Friday. Doris Bunte of the Boston PHA lived in public housing. So the women at Bromley Heath went to Doris Bunte and suggested tenant management. She encouraged it.

Now, there are some PHA's who are not as encouraging. So I want to work with them. I wouldn't push it over the resistance of the residents themselves. I do want to give them the opportunity where they want to do it, where they want to do what they are doing at Cabrini. I think you and I should encourage it because it is a movement in which I see exciting possibilities to empower the poor and to help public housing residents gain greater dignity in their communities.

Senator **Kerrey**. I should also just tell you that I have seen instances where PHA folks have reached the conclusion, in particular, that resident ownership does not work, and I consider them to be progressive operators as well. It is possible, it seems to me, for it to be a terrific idea and to be a lousy idea. I guess I haven't reached a conclusion that resident management and resident ownership is such a great idea that we ought to force it top/down.

Secretary **Kemp**. I don't believe in force, but I certainly believe in encouraging, and where I consider it progressive to encourage people to own their own apartment and manage their own affairs, I think that is progress. I think it is progress if you look at the areas of the country in which they have undertaken this type of tenant management, with an eye toward ownership. I would say they are far more progressive than places that are being dynamited.

Senator **Kerrey**. I don't think the alternative is only to dynamite.

Secretary **Kemp**. No, not at all. Where they don't want to do it, Senator, I wouldn't force it on them, but where a PHA is standing in the way of tenant management and tenant ownership, I would certainly try to change their mind.

Senator **Mikulski**. Senator Nickles.

Senator **Nickles**. Madam Chair, thank you very much.

HUD FUNDING LEVEL

Secretary Kemp, you mentioned the amount of funding. What are the total obligations HUD has concerning the units throughout the country? Do you happen to have that?

I remember Senator Armstrong asked that question a couple of years ago, and I was shocked by the answer, and I will ask you a different question while your staff is chasing that down.

The total obligations and commitments that HUD has—I think too many times we look strictly at the outlays and not the total long-term commitments. You go to a unit or something, and you are committed to making payments for years. I would be interested in having that figure if it is available.

Secretary **Kemp**. Let's come back to it.

Senator **Nickles**. In the meantime, while the staff is looking for that, I will ask you a couple of other questions.

During my opening remarks I raised my interest. You responded that you are also interested.

Secretary **Kemp**. Al Kliman said roughly $200 billion. That is HUD-assisted, HUD-owned, HUD-subsidized. That is subsidy money only, $200 billion, all of the obligations of HUD in all of the areas. It gets way up there.

Senator **Nickles**. Would you provide that for the committee and give us a breakdown of HUD total commitments?

Secretary **Kemp**. I would be happy to.

[The information follows:]

Subsidized Housing Commitments

Attached is the breakdown of HUD total commitments (obligated and reserved balances) for Subsidized Housing.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

SUMMARY OF UNEXPENDED RESERVED AND OBLIGATED BALANCES

SUBSIDIZED HOUSING

September 30, 1988 to September 30, 1990

(Dollars in Millions)

	UNEXPENDED BALANCES 9/30/88		
HOUSING SUBSIDY PROGRAMS	RESERVED	OBLIGATED BALANCES	TOTAL
Subsidized Housing:			
Annual Contributions for Assisted Housing....	31,801.6	156,328.3	188,129.9
Rent Supplement Program..................	...	1,322.8	1,322.8
Homeownership & Rental Housing Assistance....	...	28,571.2	28,571.2
College Housing Interest Subsidy............	...	580.7	580.7
Section 202 Credit Voucher Program...........	...	...	...
Total, Subsidized Housing..................	31,801.6	186,773.0	218,574.6

	UNEXPENDED BALANCES 9/30/89		
HOUSING SUBSIDY PROGRAMS	RESERVED	OBLIGATED BALANCES	TOTAL
Subsidized Housing:			
Annual Contributions for Assisted Housing....	29,763.9	142,327.9	172,091.8
Rent Supplement Program..................	...	1,326.3	1,326.3
Homeownership & Rental Housing Assistance....	...	27,900.0	27,900.0
College Housing Interest Subsidy............	...	529.7	529.7
Section 202 Credit Voucher Program...........	...	...	...
Total, Subsidized Housing..................	29,763.9	172,083.9	201,847.8

	UNEXPENDED BALANCES 9/30/90		
HOUSING SUBSIDY PROGRAMS	RESERVED	OBLIGATED BALANCES	TOTAL
Subsidized Housing:			
Annual Contributions for Assisted Housing....	27,223.0	126,415.4	153,638.4
Rent Supplement Program..................	...	1,327.7	1,327.7
Homeownership & Rental Housing Assistance....	...	27,115.3	27,115.3
College Housing Interest Subsidy............	...	508.7	508.7
Section 202 Credit Voucher Program...........	...	77.9	...
Total, Subsidized Housing..................	27,223.0	155,445.0	182,668.0

TENANT IMPROVEMENTS TO PUBLIC HOUSING UNITS

Senator **Nickles**. I believe that that is information we should all know.

Back to the point I started to make as far as allowing the tenants to work on making improvements in these units.

To give you a little history, I passed an amendment on the homeless bill that passed a couple of years ago in the Senate. It would allow tenants, the homeless, to work on the development of these projects. The amendment passed the Senate. It did not pass the House of Representatives. There was some opposition. It required a waiver from Davis-Bacon of the Contract Service Act Amendments to allow the homeless to be able to work on these units.

I would look forward to working with you because I have visited some of these housing units as well. I can also tell you that the housing units I have visited are in dire need of repair. I can also tell you I saw unemployment rates that exceeded 50, 60 if not 70 percent. I, therefore, ask the question, "Why can't these people paint it?"

We saw graffiti, broken down doors, and broken windows. Why couldn't the tenants themselves be involved in maintenance and repair?

With a little research we find that they would have to pay prevailing wages which oftentimes would preclude these very individuals from getting jobs. I think that is a serious mistake.

Secretary **Kemp**. I am most familiar, I guess, with the experience at Kenilworth. I think under these circumstances, which were narrowly specified, there was a waiver, and they were able to work out with the local construction unions some type of a waiver, but you are absolutely right.

To try to find ways to give people more of a stake in the repair and the modernization and the rehabilitation, the upgrading, as well as the chance to work in those specific areas that will give them not only a skill but the sense of dignity that we used to call sweat equity, we need to encourage it. So I would applaud that.

Senator **Nickles**. If your staff would research to see what could be done administratively and find that it needs to be done statutorily, I will be happy to work to make that happen. I think it is important that it does happen.

Secretary **Kemp**. Thank you.

DALLAS MORNING NEWS ARTICLE

Senator **Nickles**. I also think it is important, as I mentioned in my other comments, to eliminate wasteful spending in these projects. I don't know if you are familiar with it, but I will give it to you if you are not.

There was an article in the Dallas Morning News on Sunday, April 30. It talked about speculators benefit from housing plan. It talked about one individual who used to work in an S&L. He was involved in a project for 8 months and tripled his money. I will leave that article for you if you are not familiar with it.

Secretary **Kemp**. I would like to have it. Let me just give you my assurance that we will work with you and anybody else on this committee who has an equal commitment to removing that type of abuse of our Federal tax dollars. I found one of the programs had been abused, thanks to some very alert work by our Inspector General. We shut off the whole program, and we are attempting to reform and make progress and make systemic changes that will assure not only the Federal taxpayer, but also the recipient of the funds that those monies are targeted for their specific use and the upgrading of the quality of their lives and not going to people who want to take off a piece of the action.

So you have my commitment, Senator Nickles, to be that type of a HUD Secretary, and I think every man and woman at HUD right down vertically through the length and breadth of HUD would like to see the whole system fair, equitable, and helping the people who are deserving, not those who are undeserving.

Senator NICKLES. Mr. Secretary, I appreciate that comment.

SECTION 8 UNITS IN OKLAHOMA

Let me bring two units to your attention. Some of your people already are aware of this because we have been working on it for months.

As an example for those not familiar with this situation, I visited a couple of units that have been in terrible shape. They are probably rated by the director of Housing in Oklahoma as two of the worst units in the State of Oklahoma. The owners—they are section 8 units—the owners in both of these received about $800,000 per year. Their annual payments were about $276,000. They have been putting very little money into maintenance. The quality of these units is deplorable, however, I will tell you they have improved significantly in the last 3 or 4 months since HUD has threatened to cut off subsidies. It actually has cut off subsidies in a couple of cases.

The figures show that you are talking about hundreds of thousands of dollars that have been going to out-of-State landlords—often referred to as slum landlords—they have put very little money back into the units. The units are in deplorable shape. The Federal Government has been paying $434 per month on a three-bedroom apartment.

In Tulsa, OK, you can get a very nice apartment for $430-some. In other words, they are paying twice what they should be paying for 400 units. The Federal Government is paying amounts that are not realistic as far as the market and as far as wasting taxpayers' money and not providing quality housing. Even though they are paying a rate of 50, or maybe 100 percent more than what the market would dictate, they are not providing quality housing.

Three months ago I drove through these projects. Windows were broken, doors were broken. In some cases windows were boarded up. In others they were left open giving outsiders easy access to what was inside. Graffiti was all over the walls and broken glass was found everywhere, leaving no room for a playground area. A deplorable case is one where the owners were making about $1.6 million per year off of Uncle Sam.

We need to change this type of housing project. I don't think this just applies to a couple of units in Tulsa, OK. I think it applies to units throughout the country.

So I am asking the Inspector General—and I will talk to him when he appears before the committee. I will also continue working with other officials.

REDUCED SUBSIDY THREATS IN PROJECT IMPROVEMENTS

Secretary **Kemp**. Can I just say that I appreciate your bringing this to our attention as well as Senator Boren. We have, as you know, been working with both your offices to keep you informed. They are in default. We want to in no way reward poor management, and I share your sense of outrage. But I hope to resolve this matter in such a way as to take into account the needs and the well-being of the residents themselves.

I feel the same sense of outrage at lousy management and the ripoff of public monies. But I want to make sure that while we get the owners out of this type of program, we take care of those tenants, those people who need the help. We will work with your office and Senator Boren's.

I appreciate the sense of outrage that you express.

Senator **Nickles**. I am concerned about the tenants.

I will also tell you that there has been remarkable improvement in the last 4 months. Maybe that is when you start talking about cutting off subsidies or actually start cutting off the subsidies. You are talking about foreclosure. I think maybe you get people's attention.

Secretary **Kemp**. Right.

Senator **Nickles**. In spite of that fact, I wonder why it has to go that far and that long.

Secretary **Kemp**. The first thing we could do—that we did—is cut off the section 8 subsidy, but I would like to work with the Congress, and yourself obviously included, Senator Nickles, and make those systemic changes in this program that can prevent that type of abuse.

Senator **Nickles**. Also, when you look at that—I mentioned the monthly rates being far in excess to that of community standards, or at least in excess to what the market would dictate—I hope we would be looking nationwide to make sure that the Federal Government is not paying more than what the market rates would dictate for apartments throughout the country.

I think you are talking about saving a bundle of money. In many cases, 50 percent or more. If you look at it nationwide you are talking about multibillions of dollars, if you do the market rates instead of what some of these HUD contracts call for.

Mr. Secretary, thank you.

Senator **Mikulski**. Mr. Secretary, we are now going to go to probably around 5 minutes for each one of us. We will try to ask you crisp questions.

Obviously, I think the points that Senator Nickles raised were extremely important. In a few seconds I am going to talk about the renewal of contracts, Senator, in these 221(b)(3)(vi) preservation issues, but before I do, Mr. Secretary, we want to be sure we have a good data base as we do our appropriations.

TOTAL UNIVERSE OF AMERICANS NEEDING HOUSING ASSISTANCE

Would you tell us how many Americans HUD thinks some sort of low- to moderate-income housing assistance but now don't get it and how many new or incremental units of assisted housing would be needed to fund adequately to meet the need?

We are saying how many are currently not getting assisted housing benefits that you estimate would be eligible, the units people need to meet that need, and the cost of the new budget authority.

Secretary **Kemp**. In our budget justification we show about 4 million are in the worst case household category that represent very low-income families and elderly individuals with a particularly severe need for assistance. Those would include those that have a rent burden above 50 percent of income who live in severely inadequate housing, those who are displaced by some form of public action in a community. That might be through a CDBG or some type of public action displacing them.

Congress has required that we give priority to those needs, and I would imagine they are probably close, according to our figures, to around over 8 million people who have a housing problem because they are in the area of paying more than 30 percent of their income and living in structurally inadequate units.

Senator **Mikulski**. So do you estimate that you would need about 8 million units?

Secretary **Kemp**. We estimate, as I said, that the worst case, 4 million. We did an analysis that has been sent to the committee which shows that about 150,000 to 200,000 vouchers would be needed annually to make substantial progress in addressing the worst case analysis needs by the year 2005.

Senator **Mikulski**. Mr. Secretary, do you want to repeat that number again?

Secretary **Kemp**. Our PD&R analysis was 150,000 to 200,000 vouchers would be needed annually to make substantial progress in addressing the needs of those worst case scenarios.

Senator **Mikulski**. Mr. Kliman, could you fill in and tell us what type of budget authority we would need?

Mr. Kliman: We already have 100,000 vouchers in our request. Another 50,000 would take about another $1.4 billion. So $1.4 billion for 50,000, that is on the basis of vouchers.

Senator **Mikulski**. What about certificates?

Mr. Kliman: Approximately $1.6 billion. The certificate price and the voucher price are coming very close together.

GAO REPORT ON VOUCHERS AND CERTIFICATES

Senator **Mikulski**. You know, we have a GAO report that says vouchers cost more than certificates. We will talk about that as we go along.

Secretary **Kemp**. Right. May I just say, though, despite that GAO report that was done earlier, that I think gives a greater perspective on this, costs are starting to merge.

I am not trying to make a case, as I have said before various committees of the Congress. I would like to find a way, if possible, to merge the best elements of the certificate with the voucher. I am not wedded to any name. I am wedded to the idea of trying to get as much help to the tenant himself or herself than I am to the subsidy that might go off to the developer of the building.

Senator **Mikulski**. Well, I have a whole series of questions related to renewal and preservation, but I am going to turn to Senator Kerrey and see if he has some more questions.

Senator **Kerrey**. Just a couple of followups.

Mr. Secretary, do you know how many additional entitlement cities will be added in this budget under the CDBG program? Are there additional entitlement cities being added?

Secretary **Kemp**. I don't think we know at this time.

Senator **Kerrey**. Do you have an estimate? Do you expect additions to be made?

Secretary **Kemp**. I will have to supply that for the record, Senator.

[The information follows:]

Number of Additional Cities To Be Added Under the CDBG Program

In 1989, there were 72 metropolitan cities and 121 urban counties active in the CDBG program. This is expected to increase to 732 metropolitan cities and 126 counties in 1990.

ELIMINATING DRUG ACTIVITY FROM PUBLIC HOUSING

Secretary **Kemp**. Some of that depends on the census.

Senator **Kerrey**. Yes, it does.

Secretary **Kemp**. Let me work with the committee on a more specific answer.

Senator **Kerrey**. Second, the proposals that they made earlier for eliminating drug sellers and drug abusers from the public housing projects, there has been kind of a range of estimates on the cost of that program.

Do you have a firm estimate now?

Secretary **Kemp**. I don't think there is any very firm estimate. I used a rough figure, that the actual monies spent in the supplemental for fiscal year 1989 was to be $8 million. I guess that was the agreement that was reached on Friday; is that right?

Senator **Mikulski**. Yes.

Secretary **Kemp**. I was suggesting that when you think about the direct security effort coupled with, Senator Kerrey, the idea of bringing some of these units out of vacancy or rehabilitating or modernizing some of the vacant units which have been used for crack houses or drug use or some form of illicit criminal activity, I talked in the range of $80 million. Somebody took it as a very specific Kemp projection.

I would be careful to add that I am not sure I really know exactly how much, but I found in that range we might reach a consensus. So it is a ballpark figure, let me say.

Senator **Kerrey**. My concern was less in that area because I had difficulties in estimating those kinds of things as well when pressed on the costs, but my concern was whether or not it was going to come out of the PFS allocation for public housing.

Secretary **Kemp**. Our Office of Public Housing is developing an estimate. I am not anxious to use monies that are scarce for something that would be considered less vital, but I want you to know we are going to be very, very careful to try to meet both of the goals of rehabilitating the existing housing stock in the public housing community as well as to try to make them as quickly as possible drug free.

I think both of those goals are inextricably linked together, and I am having trouble trying to tell people that I think one supercedes the other. I think they are part of the same holistic approach to the Public Housing Rehabilitation Program.

Senator **Kerrey**. The concern we have—and I am sure it is one that you as well have. I have heard you talk enough about it that I am familiar with it—a mandated program ends up costing the local entity of government more than we are able to provide the funds for—that is the principal concern—or that we have to pull away from the other programs that you have mentioned, and we won't, I assume, know until we get the details.

I just express it as a concern. You are obviously concerned about it as well.

Secretary **Kemp**. Yes. I share your concern as well as your predicate.

Senator **Kerrey**. The enterprise zone we have applied. Omaha has applied it, and I support that designation.

One of the things that I strongly believe, however, though I see it as a good tool, as a good mechanism, as essentially a vessel, I think it is fair and not pejorative. It does not slam the enterprise zone concept to say that unless there is something done in addition it can become an empty vessel all by itself.

My concern is that it will not have the capacity to generate the kind of income or jobs that both you and I want to support.

Have you given some thought—since you have spent some time on the subject, have you given some thought to what we can do to help fill that vessel up?

ORIGIN OF ENTERPRISE ZONE CONCEPT

Secretary **Kemp**. I am not smiling at the question. I am smiling at the time I have spent giving thought to this answer.

I have been associated with this idea for a full 10 years. I might add, Senator, it really was not—despite popular mythology, it was not Margaret Thatcher who gave me the idea, anyway. It was really the experience that I had read about and noticed on the Island of Puerto Rico under a Democratic governor by the name of Luis Munoz Marin and Operation Bootstrap. Upon the death of Luis Munoz Marin, I got up on the floor and was memorializing his great career. Albeit a leader of the Popular Democratic Party of Puerto Rico, PDP party, he was a great admirer of Roosevelt—Franklin—as well as Abraham Lincoln, and so I told Congressman Garcia of the South Bronx, wouldn't it be great if we could design a program that would create an Operation Bootstrap type idea for the South Bronx or for Buffalo or for those areas of Omaha or Baltimore or East St. Louis or Chicago or Harlem, or whatever town, Liberty City, Miami, Watts, East L.A. I can think of lots of places where we ought to try and green line formerly red lined communities.

Now, have I given it thought? The answer is yes, and I would go beyond that and say it is not just laissez-faire attitudes toward those communities. We are not talking about abolishing health laws or safety and Food and Drug Administration laws or environmental laws or OSHA laws at all. There is nothing like that in there. It is basically targeting dramatic tax incentives. Frankly, abolish the capital gains tax on any man or any woman of any color or background that would invest their capital, their venture capital, their seed corn, and their ideas in that community as long as it creates jobs and hires people off the welfare and unemployment rolls of that pocket of poverty that we know all too often has been denied access to credit and capital.

No. 2, according to the Rangel amendment adopted in the Garcia-Kemp bill in the 1980's, anyone who invests in the debenture or the equity of that enterprise in an enterprise zone could write off his or her investment in the year in which they made the investment—expense, in other words, up to $100,000 of investment in an enterprise zone in the year in which they make that investment.

And, third, there was a very strong incentive for a woman on welfare or a man on welfare or unemployment to take the job because they would face no tax up to about 180 percent of the poverty level.

I have long believed that in this country no poor, low-income person should pay any Federal income tax up to enough of a level of the ladder that they begin to see their income increase after taxes. I don't need to tell anybody on this committee that that is where people are interested in achieving rewards, not before taxes. I don't know of anybody in this country from Buffalo to Baltimore that works for pretax income. People work for what they can take home and purchase or save.

Now, are those incentives enough? They may not be incentives enough, but they certainly are dramatic changes in the way we treat capital, labor, and welfare recipients in our inner cities.

I don't see it as the only tool, Senator. I see it among other tools, but I would like to see some entrepreneurial capital put to work on some of these vexing problems of poverty in pockets around the country.

Senator KERREY. That would be a "Yes," then. You have given it some thought. [Laughter.]

Secretary KEMP. And, furthermore. [Laughter.]

COMMITMENT OF CAPITAL IS NEEDED

Senator KERREY. Because it seems to me that it is a very vexing problem and a tragic problem, we are anxious not only to get the enterprise zone designation but to try to get a 10-, 15-, 20-year private and public commitment of additional capital which I think is going to leverage up the tax advantages of working in an enterprise zone, but it seems to me that one of the things that we need to require in any kind of venture where you are talking about construction, whether it is the construction of public housing or the construction of business, some sort of requirement for a partnership where not only do the local entities of government have to put up some money, but the State puts up some money and the private sector puts up some money as well.

I just think we can do an awful lot of leveraging if you can get a 10-, 15-, 20-, even 30-year commitment, much like— and I hate to do this because it sounds like I am kicking them around unnecessarily, but they deserve to be kicked around a bit—and that is the long-term commitments that we currently have right now, anywhere from $200 to $300 billion to bail out the S&L. We are giving them a long-term commitment, and that is the only way that it works.

It seems to me similarly inside of these enterprise zones that some kind of long-term commitment is going to be needed because you and I both know that what you do is that you get a 20- or 30-year mortgage and somehow that has to be provided.

COMMITMENT MUST BE LONG TERM

Secretary **Kemp**. Senator, I enthusiastically agree with your statement. It is profoundly wise of you to suggest that there has to be a long-term commitment. No man, no woman, no entrepreneur is going to go into a community and say I am going to give it a try for a year or two. If you look at the history of small business entrepreneurship in America, according to David Burch at MIT, that is why the Government ought to stay out of picking the winners and the losers. We ought to allow the dynamics, at least in this case, of the marketplace to work a little bit better. That has to be a long-term commitment.

So I totally concur with your statement. That is why I would like to see enterprise zones be put on not as an experiment or a laboratory, but as a commitment of this country to reaching into those pockets of poverty and doing something extraordinarily dramatic to change the small business climate for people and the job climate in those communities.

Let me just say to you directly the reason that we have not agreed to the enterprise zone designation is it would be foolish of HUD or this administration to pick Omaha or Baltimore or Buffalo or Chicago or any city in the country and tell them, yes, you have got the enterprise zone, and then not have any Federal legislation that would go along with it to tell those folks that there is something dramatically going to change in their lives or in their business climate.

So we need an enterprise zone bill before I am going to commit HUD to picking the enterprise zones or even making the determination as to which criteria to fulfill before we get into designating those zones.

Do you see what I mean?

Senator **Kerrey**. You might consider that in the designating of zones you would immediately get some allies, and I am talking about the Ways and Means Committee.

Secretary **Kemp**. You have got it. You get it passed, and you will get one. [Laughter.]

OBJECTIVE CRITERIA ARE NECESSARY

Secretary **Kemp**. It shouldn't be up to Kemp to pick it or Kerrey. It ought to be up to those objective criteria that can be filled, and I would like to suggest that we make sure that the cities and the

States work together to remove the barriers that exist to starting a business because it is not that easy.

You talk about a place in public housing where someone can go for social welfare services and special needs of the one-stop variety. Well, if you start a business today in certain cities in the United States of America, the process is so encumbering, so frustrating to many minority men and women in this country, I think, their entrepreneurship, which is pretty natural, is being smothered by Government regulation and Government red tape and Government-induced obstacles to small business opportunities, and wherever we can inject some sanity into that process I think we should do it. Enterprise zones is at least a step in the right direction.

Senator MIKULSKI. Did you get all that?

Mr. Secretary, I have a question dealing with assisted housing and then with the homeless.

ASSISTED HOUSING

In terms of assisted housing, the two issues that are confronting us really are the renewal of existing certificates and vouchers and also the preservation of existing housing stock. Your budget officer has been very good in explaining to all of us the difference between renewals and preservation. We feel that one of the most important tools to serve the poor is to renew what we have in the most efficient way and also to preserve what we have.

This takes me to my question about what is your strategy for renewing or replacing the almost 1 million section 8 assisted housing contracts that will be coming up over the next 5 years?

The budget for fiscal 1990 calls for replacing 23,000 contracts with 5-year vouchers.

Secretary KEMP. Well, Senator, almost all the 1989 expirations and many of those that expire in 1990 represent primarily 5-year loan management contracts. To comply with the requirements under the McKinney Act, HUD is proposing a 1989 reprogramming to extend expiring loan management contracts, using loan management funds instead of voucher funds appropriated for those renewals. We have proposed refunding expirations for the 1989 budget using 5-year vouchers, and the 1989 appropriation provided voucher funding for this purpose.

So there is kind of a change under McKinney, which is required from 1989 to 1990, in fiscal year 1989. But we are committed to replacing those expired contracts and being sure that we comply both with the law as well as the very important need that you suggested in the question.

Senator MIKULSKI. As you know, over the next 5 years we are going to have a terrific number of those certificates and vouchers become due.

Besides getting specific answers, I am also trying to get a big picture of the strategy from you, Mr. Secretary, one of which is that we need to talk about what it is we are going to do. We are talking about are we going to keep section 8's, are we going to keep tenant-based, project-based section 8's, are we going to take vouchers.

I just wonder where you see taking the Department in that area over the next 2 to 3 years. I wonder where you are taking us.

Secretary **Kemp**. Just to agree with what I hear as the premise of your question about the cost, funding for 1990, fiscal year 1990 is $667 million, which is included in our budget for refunding the expirations. The estimate for 1990, Madam Chair, in 1994 it would cost almost $30 billion. So there is a significant cost involved.

I guess what I would like to suggest is that not only is the staff at HUD reviewing all of the estimates to determine that proper mix of tools and the proper leadtime between the expiration and the need for funds, but also to test our data base against other measures of what is in the pipeline.

I would argue two things—No. 1, for flexibility. Obviously, we want to do it in a cost effective way, and also as a third priority, Madam Chair, I would like to make sure that there is choice for the tenants to the extent possible, but right now the budget is all vouchers.

But I would be happy and certainly welcome the chance to work with this committee, Madam Chair, to find the most viable and cost effective solution to this somewhat challenging problem for all of us on both sides of this table.

Senator **Mikulski**. Mr. Secretary, there has been talk and you, yourself, have talked about combining the best elements of both programs.

What do you think are the best elements of both, and which would you like to see combined in the single form subsidy?

SECTION 8 VOUCHERS VERSUS CERTIFICATES

Secretary **Kemp**. The original purpose behind the voucher, Madam Chair, as an alternative to the certificate was because of the flexibility it gave to the tenant, the effectiveness of using Federal tax dollars to serve the low-income community, low-income renters, and not just because they are cheaper.

So I did want to get that on the record.

There seems to be some disparity between the cost of certificates and vouchers, and I recognize the point you made earlier when you suggested that the GAO studies showed vouchers were slightly more, but they may be marginally more costly if you want to look at it that way. They are also more flexible. I like the idea of allowing a consumer to be a consumer. If we are going to help the poor, let's at least give them the dignity of having more choice as to where they can shop around.

I am not suggesting they are a cure-all or a panacea, but they are, I think, effective in giving low-income renters a chance to become shoppers. The success rate for finding suitable housing with the vouchers was significantly higher than the certificate program because the certificate was project based as opposed to a tenant-based voucher, and there were savings in the voucher program for the renter. If you could find rent at less than 30 percent of your income, less than fair market rent, you could keep that and use it in your own purchase of other commodities or services. If you wanted to get better housing, you could rise somewhat higher than the 30 percent.

So I have yet to come up with a way of marrying the best benefits of the certificates and vouchers.

FREEDOM OF CHOICE

Senator **Mikulski**. I am not encouraging that. I think that is the street talk out of the authorizing committee. Like you, I believe—one of the things that you talked about earlier was freedom of choice. It is a philosophy that I happen to believe in, and then we are talking about maybe the improvement of vouchers to make sure that the poor don't end up paying for them. The certificate has portability, and there that was absolute merit and project based.

You visited one with me in Baltimore, where we took an eye sore, an abandoned school, and turned it into a community resource. I don't know how you can combine a poor building with project based. You just can't do it. It is either going to be affordable or it is going to be project based.

Perhaps the poor need, again, the freedom of choice as well as reaching out to the private sector. Some of the private sector just might not want to get into project based because we have made it so unclear or so uncertain, and so on.

I want you to know I am not wedded to the merger. I am not opposed to it. What I am concerned about, that there be a national strategy that comes out of your Department, that we do work with the authorizing committee, and that they focus on it.

Those are my views on it. Sometimes what sounds so great in Washington in a paper-generated program means zero to those who are operating it out in local communities and the way it operates in the marketplace. So we have to make sure it works in our budget and it works in the marketplace. That is my feeling.

Secretary **Kemp**. You have no stronger supporter of that statement than the current Secretary of Housing and Urban Development because, as you mentioned, Madam Chair, I saw where that old abandoned school had been turned into a resource for the community that was frankly a model and paradigm for other communities who had had certificates that were project based.

But you would recognize, I am sure, that not all such aids are project based.

Senator **Mikulski**. That is why I come back to it. I think part of the street talk is, oh, well, the administration wants vouchers but we like section 8's, let's try to find the best of the two. That might not be good.

Secretary **Kemp**. I hear you, and what I have also asked my staff to look at that they might be interested in is to find out if there is some way that some people could gain some equity towards a down payment at some point in their use of that, where possible.

So we have not at HUD finished our study of this issue.

Senator **Mikulski**. Absolutely, and it might require, also, a whole other different concept.

MUTUAL HOUSING CONCEPT

They have something called mutual housing, borne out of a West German idea in World War II, that has some equity in it. Maybe we need to talk about some that are oriented along limited equity coverups. I am not sure.

Right now, for fiscal 1990 a new authorization of course will pass by the time we have to do this, and I am wondering what would the Department recommend for this fiscal year as the limit for which existing certificates be renewed—not the vouchers, the certificates that are coming due. Some are saying—there are those who are advocating 15, there are those who are advocating 5.

Secretary KEMP. We have advocated five.

Would you explain that, Al?

Mr. Kliman: Madam Chair, as the Secretary previously indicated, there are some changes going on in the proposals, especially for 1989. One of the things that has happened is that, as we dig deeper into the data and get more refined, we are starting to see the need for a little bit of advance funding from year to year. We are seeing already that in fiscal 1989 we must provide for some of those which we have previously shown as expiring in fiscal year 1990, especially those for the first quarter.

The same thing is going to happen in fiscal year 1990. We do not yet have all the numbers, but we are going to have to deal in fiscal 1990 with some of the expirations that would occur during at least the first quarter of fiscal year 1991.

PROBLEM OF EXPIRING CONTRACTS SURFACES

Our preliminary observation is that we are not going to have any choice, given the $1.1 billion put into the budget resolution, to go beyond 5 years, and in fact, depending on how the numbers come out, we might have to go shorter than 5 years in order to take care of all of the expirations.

Senator MIKULSKI. You see, this is our big concern, all of the ones that are coming due. Now, we talked about how some of the 1991 contracts may have to begin to be renewed in 1990.

Do you know how many units will be involved and how much it will require?

Mr. Kliman: Not yet, Madam Chair.

Senator MIKULSKI. When do you expect that?

Mr. Kliman: I have been asking that of my friends in Housing almost daily. I hope to have them this week.

Senator MIKULSKI. Your friends in Housing where? [Laughter.]

Mr. Kliman: On the ninth floor of the HUD building.

Senator MIKULSKI. Your Department? Tell them the clock is ticking.

Secretary KEMP. Madam Chair, I hear what you say.

Senator MIKULSKI. This 1991 problem affects the 1990 budget. That wasn't known when we got into this summit agreement, and we might have to get a budget amendment to do this.

Mr. Kliman: When I know the numbers, we will be dealing with the OMB on it as well.

Senator MIKULSKI. This goes to the question to you, Mr. Secretary. One of the concerns with these renewals is the tremendous unevenness with which they expire. Last year we had 1,000. This year it is 23,000, and I believe in 1 year it is going to be 295,000—next year, 295,000. That could take our whole budget. My staff tells me that it is $26 billion in current services.

Secretary KEMP. What does your staff say?

Senator MIKULSKI. That when the 295,000 come due in 1991 that could take, what, $26 billion.

Secretary KEMP. Did you say $26 billion? We estimated over $20 billion, Madam Chair. So you are right. It is a disparity, a challenge with which we must wrestle.

Senator MIKULSKI. Mr. Secretary, are you developing a plan to deal with this? Some people say even out the number of contracts that expire in a given year. I am not sure how you do that.

But what we are saying is there needs to be a strategy for just dealing with this.

Secretary KEMP. I agree, and I not only agree with you, we want to work with you on a strategy, and it is something that is incumbent upon this administration as well as the Congress, given the fact that these were entered into in good faith by lots of people over the past 15 years.

Senator MIKULSKI. That is right, and that is just the renewal issue.

Has the authorizing committee signaled to you any direction they would like to go?

It would be helpful if we had a three-way conversation in which we knew where we were going, essentially even with the navigational chart, so that whatever we do this year lays the groundwork and we are not doing something this year that totally contradicts this.

Secretary KEMP. We, at this moment, have nothing from authorization, but let me suggest I would be willing with our staff under your aegis, to join with you and the authorizing committee informally to begin the type of talks that could bring about such a strategy.

Senator MIKULSKI. Mr. Secretary, I think that is good. You have a lot of the facts. When you get your numbers, I would really suggest you bring us over to a meeting at HUD, bring the authorizing committee on a bipartisan basis, bring the appropriation on a bipartisan basis, and let's then just see where our conversations get us.

Secretary KEMP. We expect to.

HOUSING PRESERVATION

Senator MIKULSKI. Now, the preservation issue; specifically, the prepayment of 221 and 236 mortgages. The moratorium of prepayment of these mortgages expires in February 1990.

What is your policy and strategy dealing with this looming deadline?

Secretary KEMP. First of all, we do intend to renew expiring subsidies. It is a very important part of our commitment at HUD. Our fiscal year 1990 budget proposes that all expiring contracts be renewed using vouchers.

Senator MIKULSKI. You have got the renewable section 8's and the vouchers. Al gave me a very good lecture on this the other afternoon. We are now into the mortgages, the prepayment—you know, the ones who want to get out for either of several reasons, either because the areas around them have gone up in value or they want to go out and go to Gucci and condo, the others just because they have been in there a while and they would like to get out. They would be happy to sell them to a nonprofit or keep it in housing stock.

Those are two of the main reasons people want to get out. We have had a moratorium on them. That is not satisfactory to anyone.

Secretary KEMP. I know that that moratorium runs until 1990. We have $861 million in budget authority. We frankly do not know whether that is enough or too much. But the potential prepayment was approximately about 600,000 units, and of those 600,000 units, it was determined that around 360,000 units would be eligible to prepay through fiscal year 2006.

So we think with some inducement we can cut those numbers in half, and we have indicated in the past, Madam Chair, as well as personally, on a case-by-case basis our willingness to work with the Congress, with the States and the owners to avoid prepayments and make sure that we preserve this important part of our stock.

COST OF HOUSING INCENTIVES

Senator MIKULSKI. Mr. Secretary, have you had a chance to identify what those incentives would be and what the cost would be?

Clearly, it has been dumped in your lap.

Secretary KEMP. I don't know, say, what the cost of the LITC is, Madam Chair, but I made reference earlier in my testimony to my support for a low-income tax credit. I don't know whether that could be used. I don't know whether some tax change—I am going beyond my appointed testimony right now because these are things that I have to discuss with OMB and Treasury as well as Senators Mitchell, Danforth, yourself, and others.

As far as I am concerned, I would like to explore what type of tax incentives would be used and what other flexible tools we could use on a case-by-case basis to make sure that we work with you to preserve this stock.

I would also like to encourage ownership, wherever possible, or maybe the tenants themselves either through the tax system or some form of Federal program could be encouraged to take over ownership.

Senator MIKULSKI. A midway strategy could be where the tenants would have the right of first refusal, but a nonprofit would take it over and at the same time do the tenant capacity, develop it, necessary to move to full ownership. There might be a two-phased strategy.

ROLE OF NONPROFITS

Secretary KEMP. Thank you for bringing that up because I have been negligent in bringing up the tremendous role that nonprofits not only are playing but can play in this overall strategy that you and I at least conceptually share. The nonprofits in this country have been one of the bright lights to my stewardship in HUD, and I am absolutely convinced that they cannot only do a lot, but even do more if they get some encouragement and some support from those of us in Congress and at HUD.

Senator **Mikulski**. Mr. Secretary, I think we are on the same wavelength.

You know, some of these section 8's came along in the 1960's before there was a tremendous revitalization of many of our urban communities. Now, some of the neighborhoods have come back, particularly close to downtown, and they have become very desirable. I used the term "Gucci" rather flippantly. I don't know what we can do to keep them.

Then there is a whole other group of people who came into this business in the 1960's and 1970's. Housing development might have been their strategy. They themselves are now in their mid-60's. Their kids don't need to get into the business, and they would like to keep the housing stock for the poor. They would like for somebody to pick it up, but they themselves would first want to get out. They would be very happy, for example, to turn it over to the tenants, but if anybody has watched condo conversions, even in the middle and upper middle class, that requires a great deal of sophistication and moving into management.

That is why many people use the phrase, oh, tenant's right of first refusal. Well, that takes a little bit again of capacity building. That is why I suggested some other intermediary institution, even on a phased out basis, that would take it and then develop the capacity for the management and then maybe subsequently ownership.

Those are just ideas I am throwing out. I am not an authorizer, but I do have some sense of where people want to go, and there are a lot of people that just want to get out.

Secretary **Kemp**. I want to encourage you to keep throwing out those ideas because we like to thank the world for new ideas down at HUD, and I hope my brief tenure at HUD has evidenced my hospitality and, indeed, liberality toward new ideas.

We might even consider maybe one reason why—say, an individual man, woman, family, whatever, entrepreneur who was engaged in one of these things came and put it away for retirement. I think you could make the case that we ought to take a look.

Here I go. I am glad C-SPAN has left.

MAKING USE OF CAPITAL GAINS TAX

But why not recognize that these are people who got locked into an investment because their capital gains tax would be raised from 20 to 33 percent?

Very frankly, I noticed today in the New York Times and the Wall Street Journal where for the small investor and shareholder the capital gains tax became a lock on their investment. Maybe we really ought to consider President Bush's idea of cutting the capital gains tax.

Senator **Mikulski**. As I understand, President Bush's idea doesn't include it Mr. Secretary. I am in on these debates, too.

Now, again this means that we have to come back to the authorizing committees to deal with these mortgage issues, prepayment, and then, of course, there is the control issue.

Again, have you had the opportunity to undertake conversations with the authorizers on this?

Secretary **Kemp**. I wouldn't say formally, Barbara. There is a lot of interest, and I must say that I have looked at the legislation in the hopper in both the House and the Senate, and heretofore there has been a paucity of ideas as to what to do.

So I think your very alert questioning on this subject reminds all of us, both up here on Capitol Hill as well as in the administration, and I will assure you that HUD will come up with the data base, come up with the statistics, come up with some ideas and share them with you and the authorizing committees.

Senator **Mikulski**. And get everybody moving, and then after that we are going to be able to do battle and get the money to do it because even a tax strategy——

Secretary **Kemp**. I am committed to it. Let me say that to you.

Senator **Mikulski**. We appreciate that.

I would like to just move on and kind of wrap up the hearing in the next 15 minutes.

STATUS OF NEHEMIAH REGULATIONS

Nehemiah. Mr. Secretary, could you tell us what is the status of the regulations for the Nehemiah program? Do you expect to meet the deadline to make grants available?

Secretary **Kemp**. After your very perceptive analysis of the problems with the regulations on Nehemiah, continuousness meant almost, as some interpreted it, back to back. We, I think, came up with some innovative language or some possible additions to the regulations that we have sent to OMB. They are reviewing them, and they will—they were approved Friday.

Senator **Mikulski**. They were approved Friday?

Secretary **Kemp**. They changed my testimony. [Laughter.]

Secretary **Kemp**. Baltimore is certainly one of those cities, Brooklyn, NY, is another where Nehemiah legislation or regulation for Nehemiah is affected. So I personally asked OMB.

Senator **Mikulski**. We thank you for moving your own Department and also consciousness raising at OMB.

Secretary **Kemp**. You knew that we asked for the withdrawal of the rescission and got it?

Senator **Mulski**. Yes; and we are very, very appreciative of that because again here we see Nehemiah for what it was. It is meant to be a demonstration project. Let's try four or five cities.

Secretary **Kemp**. I was embarrassed. I was just told that OMB did approve our language, our regulations. So it does allow for the time of response to the contiguous question that you and I had wrestled with in Baltimore.

Senator **Mikulski**. Now, I feel we have got a roll going here. [Laughter.]

Secretary **Kemp**. It is something we worked very hard on, Madam Chair, and I am sorry that I didn't respond more favorably earlier.

Senator **Mikulski**. Now, I would like to just wrap up, and again many, many thanks for that and also for canceling the rescission.

HOMELESS ISSUE

Let's go to the homeless issue. This really goes to management issues.

One, we want to be sure that we have a picture of a demographic profile for the homeless, and we presume you could either give that to us or supply it for the record. Are there now HUD estimates of the homeless, and then major homeless advocacy groups also differ on the number, the scope, and who, and different types of homeless need different types of strategy from the homeless person who is deinstitutionalized to the single mother to the elderly to the working poor, and so on.

Do you have that, or would you like to furnish it?

Secretary **Kemp**. There is a profile that I would be happy to provide for the record. You pretty much outlined it.

Two-thirds to three-quarters are men. There are disabled, either for mental illness or alcohol or drug abuse. Seventy percent, we are told—from 50 to 70 percent have one or more of those types of problems. Over 10 percent, Madam Chair, are single women. Twenty to twenty-five percent are members of family groups, mainly single mothers with children. Thirty-six percent, we are told, in this profile are in cities at least over 100,000 who are veterans.

So as you can see, this is a broadly based type of population. It is something that we cannot, just as you suggested, find one answer toward. We have got to be concerned about the totality of the population and the many facets, the many dimensions to this issue. That was why the McKinney Act was passed.

Senator **Mikulski**. We want to do what we can to support the President's request and yours for the funding of the McKinney Act, but coming back to the management, in fiscal year 1988 there were three Assistant Secretaries with responsibility for some aspects of HUD's homeless program.

Do you have any specific plans to streamline and reorganize HUD's homeless programs to increase efficiency and fill bureaucratic gaps?

INTERAGENCY COUNCIL ON THE HOMELESS

Secretary **Kemp**. I made commitments not only to you, Madam Chairman, but to Cardiss Collins over on the House side, one, I would activate to the best of my ability the Interagency Council. I know this isn't directly responding to your question, but I wanted to coordinate all of the activities of that Council, and we are pledged to do so and go all out, Madam Chair.

Louis Sullivan at HHS has been cooperative, and I was elected the Chair. He is the Vice Chair. At HUD I am going to centralize—we are in the process of centralizing the administration of all the homeless programs under our Assistant Secretary for Community Planning and Development, Anna Kondratas, who is here today. The Interagency Council and the Community Planning and Development are going to be useful.

Senator **Mikulski**. Could you identify Ms. Kondratas?

May the force be with you? [Laughter.]

Secretary **Kemp**. And the Director of our Interagency Council, Pat Carlile, is here. She is standing right there.

So these are two women who not only are experienced in this area, but they have a deep commitment to helping make these programs work, Madam Chair.

Senator **Mikulski**. The GAO identified the Council as having a significant number of problems. I am sure you have reviewed that.

You are requesting $1.2 million or the full amount that is authorized under the McKinney Act.

Are you saying let's give Ms. Carlile a chance to get that cracking?

Secretary **Kemp**. Both Pat Carlile, the commitment of all the agencies, the commitment of Vice Chair Louis Sullivan, the commitment of Anna Kondratas, who is my representative on that Interagency Council. They have already had several meetings. They have been meeting weekly—at least biweekly, and we are committed, Madam Chair, to making that Interagency Council, cutting through red tape and trying to approach this on a kind of holistic pattern that you alluded to in your previous question.

Oh, now Mary Brunette, whom you know and has worked with me for quite some time and is my Special Assistant for Policy and Communication, reminded me of something I had forgotten to say. We also have all of our regional administrators, all 10 of them, take an individual representative in each region to be a regional coordinator for the homeless. They met last week here in Washington.

So we have started to get, I think, a handle on this diversity.

STAFFING REQUIREMENTS

Senator **Mikulski**. I understand, though, that while we were giving Community and Planning Development more responsibility for the homeless, there are areas of staffing that are going to be cut by about 100 people.

Will this adversely affect their role and their mission?

Secretary **Kemp**. We need more people.

Senator **Mikulski**. Are you going to have to talk about it?

Secretary **Kemp**. I am going to ask Al Kliman about it.

Senator **Mikulski**. According to the projection, they are going to cut staff by about 100 folks, most of whom are career people from Maryland. [Laughter.]

Mr. Kliman: Speaking as a Marylander, I appreciate that. As the Senator knows, there are reductions in this budget which are based upon program eliminations and curtailments.

Traditionally, when the committee changes the program operations, it will ask us for the staff to go along with those program changes. Additionally, when the budget amendments were sent up for the initiatives in Building a Better America, all that were sent up were the program monies and not the staff to administer those monies.

We can supply for the record the staff requirements necessary to do that job.

Also, when we do transfer the programs to CPD, there will be adjustments among the other staff organizations currently handling homeless programs so that hopefully we will have enough working for Anna Kondratas to handle these homeless programs.

Senator **Mikulski**. Fine. We will look forward to that. It will be very important for us to have it.

[The information follows:]

Staffing Requirements

The following staff-years and funding would be required if these programs were maintained in 1990 at current 1989 levels. Staffing and funding requirements in support of the budget amendments proposed by President Bush are also provided.

	Staff-Years	Funding (Dollars in Thousands)
Restorations:		
Housing:		
Headquarters:		
Multifamily Insured Programs (Coinsurance)	5.0	$ 256
Loan/Mortgage Management (Preservation)...	10.0	512
Section 8 Moderate Rehabilitation.........	5.0	256
Policy Direction and Systems Support......	10.0	512
Subtotal..................................	30.0	1,536
Field:		
Multifamily Insured Programs..............	33.8	1,167
Loan/Mortgage Management..................	309.0	10,671
Section 8 Development.....................	10.2	352
Section 8 Management......................	39.5	1,364
Section 202 Development...................	55.6	1,920
Property Disposition......................	21.9	756
Subtotal..................................	470.0	16,230
Housing Total:		
Multifamily Insured Programs..............	38.8	1,423
Loan/Mortgage Management..................	319.0	11,183
Section 8.................................	54.7	1,972
Policy Direction and Systems Support......	10.0	512
Section 202 Development...................	55.6	1,920
Property Disposition......................	21.9	756
Subtotal..................................	500.0	17,766
Public and Indian Housing (Field):		
Restoration to 1989 staffing level........	276.1	11,086
Community Planning and Development:		
Headquarters:		
CDBG......................................	3.0	168
UDAG......................................	21.2	1,190
Rehabilitation Loans......................	3.0	168
Subtotal..................................	27.2	1,526
Field:		
CDBG......................................	30.0	1,319
UDAG......................................	23.6	1,038
Rehabilitation Loans......................	29.6	1,302
Subtotal..................................	83.2	3,659

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	Staff-Years	Funding (Dollars in Thousands)
Community Planning and Development (Con.):		
Community Planning and Development Total:		
CDBG	33.0	$1,487
UDAG	44.8	2,228
Rehabilitation Loans	32.6	1,470
Subtotal	110.4	5,185
Field Direction and Operational Support	5.0	241
Field Administration	44.0	1,500
Total Restorations	935.5	35,778
Bush Initiatives:		
Housing (Field):		
Transitional Housing	6.6	228
Public and Indian Housing:		
Special Homeownership Program:		
Headquarters	10.0	542
Field	20.0	803
Subtotal	30.0	1,345
Community Planning and Development:		
Headquarters:		
Emergency Shelter Grants	3.5	196
Comp. Service & Shelter Program	10.0	561
Subtotal	13.5	757
Field:		
Emergency Shelter Grants	21.9	963
Enterprise Zones	7.2	317
Comp. Service & Shelter Program	20.0	880
Subtotal	49.1	2,160
Community Planning and Development Total:		
Emergency Shelter Grants	25.4	1,159
Enterprise Zones	7.2	317
Comp. Service & Shelter Program	30.0	1,441
Subtotal	62.6	2,917
Policy Development and Research (Headquarters):		
Supplemental Assistance for Facilities to Assist the Homeless	4.0	233
Field Administration	4.0	136
Total Bush Initiatives	107.2	4,859
Total Restorations and Bush Initiatives	1,042.7	40,637

NEW HOMELESS INITIATIVE IN CDBG

Senator **Mikulski**. Now, you have requested $50 million in CDBG block grants for the new homeless initiative.

Would you give us a snapshot of what you would like to do with that?

Secretary **Kemp**. That was under the request of the President to have an innovative public/private partnership on a matching basis with States, $50 million at the Federal level, matching at the State level, to try out some of those programs in which some of these very outstanding nonprofits across the country are doing some innovative, positive, and quite progressive things, helping families, helping single-parent families, and doing something particularly in the field of mental health as well as families, I feel very strongly in the short period of time that I have been at HUD.

I would like to encourage and in some cases outright subsidize of some of those outstanding programs that are already taking place around the country.

I noticed the other day in the New York Times they had a series on helping the homeless, and they talked about the possibility of some type of help to those who are mentally impaired to one degree or another, who need some community-based help. They don't need to be institutionalized, but they need something at the neighborhood level that they didn't get, since Congress or the administrations in the past never funded the community-based mental health care. It was envisioned, I guess—way back, to President Kennedy and so well-articulated by Senator Moynihan.

So I would like to see if we can't energize or activate or incentivize some of those nonprofits into doing some innovative things in the field of mental health, as well as for families who are homeless.

Senator **Mikulski**. We are on the right track here, Mr. Secretary. I think one of the most important mental health components is to have stable shelter.

Imagine this. Being old, being maybe in a mental hospital because of a history of psychosis or substance abuse, and then every night you don't know where you are going to sleep, every night you are either cold or hungry or the possible target of violence. Who wouldn't be mentally ill under those circumstances?

Everybody needs a home. Everybody needs a place where they know that is where they are going to be that night.

And we really appreciate the President's commitment to this. So we look forward to working with you.

TRANSFER OF FEMA PROGRAM TO HUD

My last question is—there is this whole discussion of taking the FEMA program to help the homeless and moving it to HUD. We wondered what your reaction to that is because, again, we have a GAO report that says FEMA spends 78 percent of the money that is given for the homeless; whereas, HUD in somewhat of a parallel—well, not parallel—but in their programs got out 10 percent, 9 percent, 5 percent, and 0. So FEMA's Emergency Food and Shelter Program got out 78 percent of their money; HUD's emergency shelter grant program got out 10 percent. HUD's section 8 occupancy, which is what we were just talking about, which tends to be the deinstitutionalized and the elderly alone, didn't get anything.

By the way, this study just came out. What happened on Friday, obviously, the supplemental went through and your staff might disagree with this, but it shows some of the problems we are facing, and I am not arguing that it stays over at FEMA but there was money in HUD that in some way or another got divvied out to the needy for which it was intended.

Is the new Assistant Secretary—have you been confirmed yet?

Secretary KEMP. No.

Senator MIKULSKI. The speed of these confirmations must really be driving everybody crazy.

This isn't meant to be a tricky question. It just goes to what we are facing.

Secretary KEMP. Well, first of all, let me answer your question broadly by suggesting that there is not going to be any change in the basic program or any goal of that basic program. We think it will be better coordinated through HUD.

We think we can get this program working better, and we are not trying to make cuts in this very important program area, and I would make a case that transferring the FEMA program to HUD makes sense.

I called Chairman Traxler. I think we are only suggesting the transfer so that we can strengthen our commitment, and there is not a man or woman at HUD whom I have met, Madam Chair, who is not committed to this great goal in our stewardship of these years.

So all I can say to you is we want to recognize the integral role that this program can play. We are not going to end it or cut it or diminish it one iota.

Senator MIKULSKI. I think you made your point. We just wanted to bring that to your attention.

Secretary KEMP. I am glad you did. I know your commitment.

Senator MIKULSKI. I think we have had a pretty good session, and I know you need to go back and return those phone calls. I have got to call Mayor Schmoke.

SUBCOMMITTEE RECESS

I feel that this was an excellent hearing. We really covered a tremendous amount of ground. We are going to be recessed now. This subcommittee will stand in recess until tomorrow at 10 a.m., when we will continue to take testimony from your Department and also will be taking testimony from the Inspector General, and I would like to meet the Assistant Secretary designate.

Thank you very much.

[Whereupon, at 4 p.m. Monday, May 15, the subcommittee was recessed to reconvene at 10 a.m., Tuesday, May 16.]

VA, HUD, AND INDEPENDENT AGENCIES APPROPRIATIONS FOR FISCAL YEAR 1990

TUESDAY, MAY 16, 1989

U.S. Senate,
Subcommittee of the Committee on Appropriations,
Washington, DC.

The subcommittee met at 10:13 a.m., in room SD–138, Dirksen Senate Office Building, Hon. Barbara Mikulski (chairman) presiding.

Present: Senators Mikulski, Garn, Fowler, and Grassley.

Also Present: Senator Adams.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Office of Inspector General

STATEMENT OF PAUL A. ADAMS, INSPECTOR GENERAL

OPENING REMARKS OF SENATOR MIKULSKI

Senator **Mikulski**. Good morning everybody. The committee will now be back in session. The subcommittee will begin its second of 2 days of hearings on the HUD fiscal 1990 budget. This morning we are going to hear from HUD's Inspector General, Paul Adams, regarding his own work and his own ongoing investigation of abuses in the moderate rehab program.

Then we will proceed again with Secretary Kemp on our discussion of the budget request.

HUD'S INSPECTOR GENERAL TESTIFIES

I consider asking an Inspector General to testify before our subcommittee to be an extraordinary event. But the nature of the recent discovery is extraordinary indeed.

All of us were disturbed by the recent revelations about the excessive use of highly-paid consultants and charges of favoritism in awarding moderate rehabilitation grants.

The fact that some consultants received $1,500 per unit in fees for having an inside track to the right people in the Department is outrageous. It is an outrage not only to those fine people of low and modest incomes designed to benefit from the program, but to the American taxpayer who means to help the poor.

The subcommittee will be looking to learn more about this investigation today from Mr. Adams, and then turn to Secretary Kemp, on whose watch these abuses did not occur, but who has the responsibility for cleaning it up and then to get a picture of what he intends to do.

We intend to work with Secretary Kemp to prevent this kind of abuse from happening again. We look forward to hearing about the investigation and the recommendations of the inspector general on this.

I believe that Secretary Kemp has taken positive steps by suspending future moderate rehabilitation awards, but at the same time we don't want to penalize the good guy communities who have gone by the rules and who are out there ready to do moderate rehabilitation.

Mr. Adams, we welcome you to the committee.

Before we begin, I'm going to ask my ranking minority, Senator Garn, if he has any opening comments.

PREPARED STATEMENT OF SENATOR GARN

Senator **GARN**. Thank you very much. I do, Madam Chairman, but in the interest of time I would simply ask unanimous consent that my statement be placed in the record.

Senator **MIKULSKI**. Without objection, so ordered.

[The statement follows:]

STATEMENT OF SENATOR GARN

Secretary Kemp, I'd like to welcome you to our hearings today in your new capacity as head of the Department of Housing and Urban Development. As one who has followed your Department's budget and programmatic trials over the past decade, your energy and leadership ability are indeed critical and will be fully tested to address the myriad of concerns confronting the Nation's housing and urban development agenda.

Perhaps the most vexing problem we confront, aside from the sheer magnitude and scope of these programs, is their complexity, technical obscurity, and history.

Then we must grapple with the enormous cost of housing activities, and therein deal with yet further confusion.

For example, I have often noted that this Subcommittee has cut housing programs by 60 percent since 1980. However, that statistic is for new budget authority, and if one does the same comparison for actual budgetary outlays, the taxpayers will spend in fiscal year 1990 nearly three times the 1980 level (a total of $16.2 billion vs. $5.6 billion in 1980). So while we can say, on one hand, that we have "cut" housing assistance to a third, we can also say that we have tripled it in the last ten years.

Confusing, contradictory, and both correct.

But beyond these "details", we are confronted with widespread concern and dissatisfaction with the Nation's performance in addressing the plight of homeless families and individuals; in keeping alive the hope of home ownership to honest, hard working families; in assuring an opportunity to seek a decent place to live for poor families and a helping hand to improve their economic status.

These very real problems cannot be swept away by rhetoric and budgetary slight-of-hand.

I applaud your courage in taking on this most difficult and challenging responsibility. And I pledge my support and hope for your success.

PREPARED STATEMENT

Senator **MIKULSKI**. Mr. Adams, we welcome you to this committee. I'm a big fan of the inspector general, I think that they're important. We need watchdogs that watch, that bark and who have an opportunity to bite. So let's see what you've got to tell us.

Mr. ADAMS. Thank you, Madam Chair. With your permission, I'd like to submit my statement for the record and try to briefly summarize, if I may.

Senator MIKULSKI. Certainly.

[The statement follows.) .

STATEMENT OF PAUL A. ADAMS

Madam Chair and Members of the Subcommittee, I appreciate the opportunity to appear before you today to discuss our recent audit and investigation of the Section 8 Moderate Rehabilitation Program.

The purpose of the Moderate Rehabilitation Program (Program) is to upgrade substandard rental housing and provide rent subsidies for very low and lower-income families. Our work revealed the process for selecting Public Housing Authorities (PHA's) that received moderate rehabilitation funds, until May 1988, was undocumented and ignored existing standards and regulations. This combined with other events which I will describe more fully, led to a growing perception of favoritism.

Early in the review process we recognized potential criminal violations. Accordingly, we met with officials of the Department of Justice for the purpose of keeping them informed and obtaining guidance on the course of the investigation. The briefings with the Department of Justice continued throughout our investigation, and the results of our audit and investigation have been provided to the Public Integrity Section and FBI for their consideration. I have kept the Secretary advised and met with staff of the House Subcommittee on Housing and Community Development and the House Subcommittee on Employment and Housing on several occasions.

The results of our audit and investigative work disclosed that the Program was poorly managed by HUD Headquarters and the field offices. Weaknesses were numerous and significant, and covered the entire spectrum of Program activities. Problems were noted at the PHA's, developer, and lender levels.

The majority of the projects funded over the past 5 years were selected by PHA's without open competition and the funded PHA's/projects appeared to be concentrated in certain areas of the nation. Former HUD officials participated as developers, consultants and/or lenders in at least 55 of the projects funded. In other instances, other former government officials also acted in similar capacities.

We initiated our review based on prior audit results and on information from a variety of sources including staff members of the House Subcommittee on Housing and Community Development, confidential informants, PHA officials, government employees and scattered media stories. I might point out that all of these sources expressed concern regarding favoritism and possible "payoffs" to influence the allocations but, were unable to furnish any evidence to support their concerns. We pursued each lead provided by these sources during the course of our audit and investigation.

In order to conduct our audit and investigation, we had to first gather data regarding program participants. Because HUD had no systematic way of identifying developers, consultants and lenders involved in the program, our audit staff developed a questionnaire for the PHA's receiving funding for more than 25 units. The information received from PHA's, coupled with allegations cited previously, enabled us to target our audit work.

I would now like to discuss some details of the objectives, scope, and results of the audit and investigative efforts. First, I'll discuss the audit work that culminated in our report issued on April 26, 1989.

The audit was performed during the period March 1988 through December 1988, and generally covered activities from January 1, 1984, through November 30, 1988. In addition to our summary report, we have thus far issued 24 audit reports covering PHA activities, 7 reports covering Field Office activities and a report on a coinsurance lender. Ten additional PHA audits are in process.

The primary audit objective was to perform an overall evaluation of the Program to determine if it was administered in an efficient, effective and economical manner. The review was conducted at HUD Headquarters, HUD Field Offices, PHA's, and at the offices of owners, contractors and a coinsurance lender.

At HUD Headquarters, we evaluated whether HUD's:

- Selection of PHA's for funding complied with the appropriate regulations.
- Guidance and policies were sufficient to aid PHA's in administering the Program.
- Management gave sufficient attention to sound internal controls in administering the Program.

During the Headquarters phase of the audit we interviewed all former Assistant Secretaries or equivalents and most of their key staff involved in Program activities during the audit period.

At Field Offices, our objectives were to determine whether staff:

- received appropriate training;
- performed required monitoring reviews of PHA's; and
- approved PHA rent calculations.

Our work at PHA's was designed to determine if PHA's complied with HUD requirements and their own Administrative Plans in:

- Selecting owners to participate.
- Determining project feasibility and unit eligibility.
- Calculating contract rents.

As part of the PHA audits, we also performed selected audits of owners' certified project costs and contractors' rehabilitation costs. In addition, we audited the procedures followed by a coinsurer in underwriting 14 HUD-insured mortgages for moderate rehabilitation projects.

At this point, I think it would be appropriate to provide a brief overview of the Program to better assist you in understanding the audit results.

The Moderate Rehabilitation Program is authorized by Section 8 of the U.S. Housing Act of 1937, as amended. HUD approves program participation by, and allocates funding to, eligible PHA's.

The purpose of the Program is to upgrade substandard rental housing and to provide rental subsidies for very low and lower-income families. Generally, 95 percent of all eligible units in a moderate rehabilitation project are intended for very low-income families. These are families whose income is 50 percent or less, than the median income for the area. The remaining 5 percent of the units are for families whose income is below 80 percent of the median income for the area. A minimum expenditure of $1,000 a unit is required, including the prorated share of work to be accomplished on common areas or systems. The expenditure is intended to: (1) upgrade the unit to comply with the Housing Quality Standards (HQS) approved by HUD from a condition that is below those standards (improvements other than routine maintenance); or (2) repair or replace major building systems or components in danger of failure. Units occupied by families not eligible for housing assistance are not eligible for inclusion in the Program.

PHA's receive funding allocations from HUD. During most of our review period, HUD allocations were made under the Headquarters Reserve process because Congress each year waived the "fair share" allocation. The "fair share" process was designed to distribute funding to localities throughout the nation in line with "needs based formulas" developed by HUD's Office of Policy Development and Research. The HUD regulations governing the Headquarters Reserve process provide that when application demand exceeds all approvable applications, HUD will rank the applications based on its assessment of which applications have the best combination of the following five enumerated criteria: (1) demonstrated capacity of the PHA or its contractors to provide required rehabilitation technical assistance to owners; (2) availability of financing resources; (3) the PHA's experience with the Section 8 existing housing program or the PHA's overall administrative capability; (4) the potential of expeditious achievement of rehabilitation and leasing the unit; and (5) the overall feasibility of the proposed program. This competitive process is designed to provide funding to PHA's that are well suited to carry out the Program.

After an allocation is made to a PHA, HUD enters into an Annual Contributions Contract with the PHA spelling out the amounts and terms of the funding arrangement. The PHA then conducts a local competition by soliciting applications from owners or developers to determine which units are feasible for inclusion in the Program.

For units determined eligible, the PHA and owners execute an Agreement to Enter into a Housing Assistance Payments Contract. When the units are rehabilitated and the work accepted by the PHA, the Housing Assistance Payments Contract is executed for a term of 15 years. The owner receives a contract rent that is defined as the total rent including the rent paid by the family.

During the audit period about 35,780 units were funded representing Contract and Budget Authority totaling about $225 million and $3.4 billion, respectively.

Based on our audit results, we concluded that there is little assurance that housing is being provided to those areas having the greatest need; and that limited program funds are being spent efficiently and effectively. There was minimal or no documentation or accountability for the PHA's selected by HUD Headquarters to receive funding allocations. Moreover, PHA's selected developers without complying with the need for an effective competitive selection process and often in violation of their own Administrative Plans. There was an absence of clear written policy and guidelines. This fact, coupled with the evolution of the Program into a large-scale development program, caused the following problems: (1) PHA's were ill-equipped to determine effectively the nature and extent of rehabilitation work needed or the rent levels required to make projects feasible and economical; (2) HUD staff similarly were neither made available nor well prepared to monitor PHA activities and render needed technical assistance; and (3) HUD and PHA staff abdicated their responsibilities to developers, consultants and, in some cases, mortgage lenders.

There is little assurance that units were allocated to PHA's equitably or that the projects were selected competitively. This situation is largely responsible for the widespread perception that exists among program managers and participants alike that the Program is a Headquarters-driven program favoring certain PHA's, owners, developers, etc.

Our report pointed out that the Headquarters selection process dictated a significant shift in program operations that set the stage for many of the Program weaknesses. Key points and applicable references are:

- Only about 204 of the approximate 3,000 PHA's received funding allocations during the five-year period. (Appendix A)

- Ten States received over 51 percent of all units whereas their fair-share needs percentage, as developed by HUD, was only about 16 percent. (Appendix B)

- Fifteen PHA's received four or more allocations each during the period, representing over 33 percent of all units allocated. (Appendix C)

- Former HUD officials and employees actively sought and participated as developers, consultants or lender representatives in at least 55 projects. (Appendix D)

In addition, our report cited various conditions that existed in 69 projects we reviewed, which indicated possible project-specific selections by Headquarters. Specifically:

- In 19 projects, we noted that developers approached PHA's claiming that if the PHA's applied for units, an award would probably be made for them.

- In 25 projects, the developers paid consultants, some of whom were former HUD officials, for services that equated in part to lobbying HUD officials on the developer's behalf.

- In 49 projects, the ultimate awards made by HUD and/or the PHA closely approximated the number of units owned or controlled by a specific developer.

These conditions demonstrate the absence of the type of open competition at the PHA level intended in HUD regulations. The conditions also fostered a widespread perception among PHA officials that HUD's selection process was not governed by the regulatory criteria.

The costs, in terms of dollars and program integrity, are extremely high. As mentioned earlier, PHA's and HUD staff were ill-equipped to administer the Program and compute contract rents properly. At 15 of the 20 PHA's audited, we found that potential overpayments existed. These overpayments were caused by the PHA's failure to comply with HUD handbook requirements. This was further compounded by HUD's failure to (1) update and improve the written guidance covering rent calculations, and (2) provide technical assistance and monitor PHA's operations. Our audit noted that PHA's in calculating rents (1) included ineligible units; (2) allowed ineligible rehabilitation costs; (3) used incorrect data; and (4) made mathematical errors.

Excessive housing assistance payments will total $58.8 million during the 15-year contract terms for the 43 projects we reviewed at 20 PHA's in 7 different regions. (Appendix E) Using all units included in the 20 PHA's audited, as a universe (i.e., 5,099) this comes to an average of $11,544 per unit in potential overpayments. Multiplying the $11,544 by all units (35,780) allocated during Fiscal Years 1984 through 1989, as of November 30, 1988 our audit cut-off date, we arrived at total potential overpayments of $413 million. This is a realistic estimate since we believe our test results are indicative of the conditions at other projects funded over the past 5 years. I might point out that the PHA's audited, varied in size, staffing, location, etc., yet all appeared to experience similar systemic problems. Additionally, our ongoing audit work at the additional PHA's in 5 regions indicates that the same problems are occurring. With regard to program integrity, HUD staff as well as PHA officials have little confidence that the Program is administered in an economical, effective or efficient manner.

We attribute the Program's current condition to a lack of commitment on management's part to provide attention to those areas needing it most. For example, the program regulations were not revised to keep pace with program policy and actual program practice. Handbooks, directives and other written guidance became a patchwork collection of unrelated and unclear instructions for both HUD staff and PHA program people. Numerous shifts occurred within the HUD offices regarding responsibility for the Program. Adequate staffing and training resources were not provided. All these factors tended to confuse or blur the lines of authority and resulted in essentially no accountability.

Concerted efforts are needed to overcome the reported weaknesses. Staff resources need to be allocated and given priority assignments in order to recover overpaid assistance, to adjust contract rents to their proper levels, to monitor ongoing PHA activities, and to upgrade program guidance and regulations. HUD managers have already taken, or agreed to take, steps to resolve 19 recommendations in our audit report. We are impressed by management's reaction to our report and we will work closely with them in assuring that appropriate corrective actions are taken.

While the audit was in progress, we began an investigation because of indications that the allocation process for the Program was not competitive and a strong perception of favoritism existed. This was based on the apparent allocation of units to specific projects or developers, some of whom were former HUD employees; the payment of substantial fees of up to $1,500 per unit by developers to consultants, including former HUD employees, for assistance in obtaining the units; the apparent access to inside information by former employees; and the contributions by participants in HUD programs to a charitable organization supported by Thomas Demery, then Assistant Secretary for Housing-Federal Housing Commissioner.

Developers, consultants, and PHA employees were interviewed concerning projects that were awarded Program units. This was combined with our efforts to gather information on contributions to the charitable organization, as well as fees paid to former HUD employees for consulting work. We subpoenaed records and interviewed those who agreed to meet with us. We were unable to interview certain former employees who declined to be interviewed. I would like to point out that we cannot compel someone to be interviewed.

Our investigation disclosed a definite perception that favoritism existed in the allocation process. Contributing to this perception were frequent instances where the number of units awarded coincided with the specific number of units proposed by certain developers. For example, there were 312 units awarded to the Maryland Department of Economic and Community Development, which was the number proposed by Ms. Judith Siegel for Kingsley Park, a project in Essex, Maryland. Although, Ms. Siegel also participated in the Program as a consultant to other developers, James Watt, former Secretary of Interior, was paid $300,000 to act as consultant on Kingsley Park. Another example was the award of 160 units to the Clark County Housing Authority (CCHA), Las Vegas, Nevada. Philip Abrams, former Assistant Secretary for Housing and former Under Secretary, wrote a letter on May 10, 1986 to Ms. Deborah G. Dean, then Executive Assistant to the Secretary, which asked that the CCHA be awarded 160 units. On May 22, 1986, HUD allocated 160 units to CCHA, who in turn, awarded the 160 units to Sierra Pointe Apartments, a project which was developed by Winn and Associates, a company in which Mr. Abrams had an interest.

Our interviews of PHA officials and others indicate that it was their perception that developers were being awarded units as a result of fees paid to consultants including Joseph Strauss, former Special Assistant to the Secretary, who received over $1,300,000; Gerald Kisner, former Deputy General Counsel, who received $282,500; and Michael Karem, former Deputy Assistant Secretary for Multifamily Housing, who received $420,000. A list of consultants identified during our work, and fees earned is attached as Appendix F.

We also found instances where developers received information about the allocation of units before the PHA's were notified. For example, Mr. J. Michael Queenan, an associate of Winn and Associates and a former Director of Housing Development, HUD Denver Regional Office, advised the Director of the Richland, Washington Housing Authority of the award of units even before the Seattle HUD Regional

Office was notified by HUD Headquarters. In Dade County, Florida, we found evidence that developers and owners were receiving information on unit allocations to PHA's even before notification to the PHA. Such information included copies of memoranda from Mr. Demery to the HUD Regional Administrators detailing the allocation of units, as well as the HUD forms assigning funding and contract authority to the PHA.

Information was developed during the audit indicating that a developer contributed to F.O.O.D. FOR AFRICA (FOOD), a charitable organization listed on Mr. Demery's Financial Disclosure Statement for which he served in an official capacity since 1985. While we found no reason to question the stated purpose of FOOD, we identified contributions totalling $290,554 that were made to FOOD by participants in HUD programs between January 1986 and 1988. This amount represents 50 percent of the funds raised during the same period. Mr. Demery served as Secretary for FOOD until October 1986 when he began his HUD employment. While initial fundraising efforts were targeted at religious congregations, Mr. Demery and others later directed the fundraising efforts toward business and commercial enterprises. We were able to determine that Mr. Demery attended most of the fundraising events and made introductory remarks at some of the functions he attended. The events were sponsored by various individuals and companies, including certain participants in the HUD programs such as Michael Karem and J. Michael Queenan. Contributions to FOOD included $36,000 from Mr. Queenan; $15,000 from Joseph Strauss; $19,000 from Benton Mortgage Company, a co-insurance mortgagee on approximately 45 Mod Rehab projects; and $27,000 from Real Property Services Corporation, a major participant in HUD projects. In June 1988, Mr. Demery sought to obtain General Counsel approval for a letter endorsing FOOD utilizing his official title and Departmental letterhead. His request was declined. On November 21, 1988, I provided some preliminary information on our investigation to Mr. J. Michael Dorsey, then General Counsel, for a preliminary opinion on possible Standards of Conduct violations. Mr. Dorsey responded on December 12, 1988 that no violations had occurred.

As I stated earlier, our Report of Investigation is still under review by the Public Integrity Section of the Department of Justice.

Secretary Kemp has taken an active interest in our Office and met with me immediately upon arriving at HUD to learn first-hand of significant on-going audits and investigations. I provided him details of these efforts at that time. He and his staff have responded quickly and positively to our report. In early March, we provided our draft audit report to the Office of Housing for review and comment. We also provided Secretary Kemp with summaries of the report findings. In mid-April, we provided Secretary Kemp with our report on investigation.

On March 31, 1989, the Office of Housing provided outlines and target dates for steps to be taken to resolve 19 audit recommendations. Secretary Kemp sent memoranda to top program managers in the Field and Headquarters that summarized the problems we identified, and explained his commitment to taking corrective actions.

On April 26, 1989, Secretary Kemp announced a series of actions he took to assure that HUD funds benefit the most deserving recipi-Ents. More specifically, he announced that:

- All FY 1989 funding selections were canceled for those PHA's that had not yet executed an Annual Contributions Contract.
- Over 300 projects funded during the audit period will be reviewed by HUD staff to determine if the projects were selected properly and the rent rates were computed accurately.
- A new selection process will be developed by the Office of Housing and will be used to reallocate the canceled FY 1989 funds.
- The Office of General Counsel will review existing rules and laws to determine whether new regulations are needed to govern HUD employees' involvement in funding decisions. This review will also define prohibited conduct by recipients of HUD grants, loans, subsidies and other programs.

Secretary Kemp and his staff have responded positively and appropriately to our audit and investigative reports. I am confident that his personal commitment to strengthening the Program's effectiveness will significantly improve the economy and efficiency of the Program and restore public confidence and program integrity. We look forward to working closely with Secretary Kemp in this regard.

This concludes my remarks and I appreciate your attention.

APPENDIX A

SCHEDULE OF FUNDING ALLOCATIONS
DURING AUDIT PERIOD
1984 - 1988

REGION	ALLOCATIONS	UNITS PER ALLOCATION				PHAs RECEIVING ALLOCATIONS
		UNDER 25	25 - 49	50 - 99	100 & OVER	
1	26	3	4	11	8	13
2	35	2	4	9	20	24
3	49	16	10	10	13	28
4	60	2	7	17	34	36
5	34	3	3	8	20	17
6	35	1	3	14	17	34
7	10	2	1	1	6	9
8	32	4	4	14	10	14
9	21	1	3	4	13	14
10	16	3	9	2	2	15
TOTALS	318	37	48	90	143	204
PERCENTAGE OF ALL ALLOCATIONS	100	11.6	15.1	28.3	45	

APPENDIX B

SCHEDULE OF FUNDING ALLOCATIONS NOT CONSISTENT WITH FAIR SHARE PERCENTAGES (WHERE DIFFERENCES EXCEED 1.0 PERCENT) 1984 - 1988

STATE	PERCENTAGE OF FUNDS ALLOCATED	FAIR SHARE PERCENTAGE	EXCESS FUNDING (UNDER) FUNDING
FLORIDA	15.15	3.3	11.85
PUERTO RICO	6.91	1.0	5.91
COLORADO	4.63	1.0	3.63
OKLAHOMA	4.05	.9	3.15
VIRGINIA	4.40	1.9	2.50
NEVADA	2.85	.4	2.45
DISTRICT OF COLUMBIA	2.30	.7	1.60
UTAH	1.72	.4	1.32
ILLINOIS	6.36	5.1	1.26
LOUISIANA	2.75	1.5	1.25
SUBTOTALS	51.12	16.2	34.92
CALIFORNIA	4.94	16.6	(11.66)
NEW YORK	2.66	13.6	(10.94)
PENNSYLVANIA	1.83	3.8	(1.97)
MICHIGAN	1.45	2.7	(1.25)
MINNESOTA	.24	1.4	(1.16)
INDIANA	.22	1.3	(1.08)
SUBTOTALS	11.34	39.4	(28.06)

APPENDIX C

SCHEDULE OF PHAs RECEIVING
FOUR OR MORE FUNDING ALLOCATIONS
1984 -1988

PHA	NO. OF ALLOCATIONS	NO. OF UNITS	AVERAGE UNITS PER ALLOCATION
METRO DADE, FL	14	2879	206
RICHMOND RHA, VA	9	982	109
ILLINOIS HDA	6	968	161
COLORADO HFA	6	773	129
NEW JERSEY DCA	4	753	188
DISTRICT OF COLUMBIA HCD	4	673	168
MASSACHUSETTS EOCD	8	673	84
OKLAHOMA HFA	4	659	165
CHICAGO HA	4	646	161
MICHIGAN SHDA	6	527	88
SAN DIEGO HC, CA	4	433	108
SHREVEPORT HA, LA	4	310	77
DENVER HA, CO	4	203	51
PHILADELPHIA HA, PA	6	166	28
MONTANA DOC	4	150	38
TOTALS	87	10795	124

APPENDIX D

SCHEDULE OF FORMER HUD EMPLOYEES
PARTICIPATING IN MRP

POSITION HELD AT HUD	NO. OF PROJECTS PARTICIPATED IN AS: OWNER/DEVELOPER	CONSULTANT	FEE BASED LENDER REP
Undersecretary	6		
Asst. Secretary for Housing	7		
Executive Asst. to Secretary	6		
Special Asst. to Secretary		13	
Deputy Asst. Secretary for Hsng.		3	
Special Asst. to Asst. Secy. for Hsng.		2	
Deputy General Counsel		3	
Regional Administrator	2	2	2
Regional Director for Hsng. Mgmt.	20	3	12
Regional Financial Mgmt. Specialist	4	3	19
TOTALS	45	29	33

Several individuals were involved in the same projects. About 55 separate projects were noted where a former HUD employee participated.

APPENDIX E

NAME AND POSITION	NO. OF PROJECTS PARTICIPATED IN AS: OWNER/ DEVELOPER	CONSULTANT	CONSULTANT FEES
Philip Abrams, Under Secretary	6		
Philip Winn, A/S for Housing	7		
Lance Wilson, Exec. Asst. to the Secretary	6		
Joseph Strauss, Spec. Asst. to the Secretary		13	$1,305,875
Michael Karem, Deputy A/S for Multifamily Housing		3	420,000
Rick Price, Spec. Asst. to A/S for Housing		2	125,149
Gerald Kisner, Dep. General Counsel		3	282,500
Ronald Gatton, Regional Administrator (Chicago)	2	2	94,000
J. Michael Queenan, Reg. Dir., Housing Mgmt. (Denver)	20		
Ronny Mahon, Reg. Financial Management Specialist	4		
R. Carter Sanders, Deputy Assistant Secretary			107,000
			$1,946,524

OTHER CONSULTANTS - NON-HUD

Edward Brooke	$ 183,000	
Fred Bush & Co.	260,000	($65,000 outstanding balance)
Louis Nunn	375,000	(includes attorney fees of $225,000)
Judith Siegel	351,000	
James Watt	300,000	
Rick Shelby	442,000	
	$1,911,000	

REPORT ON MODERATE REHABILITATION PROGRAM

Mr. ADAMS. Early in the effort that we undertook, we recognized the potential for criminal violations. Accordingly, we coordinated our efforts throughout the process with the Department of Justice and many of our decisions were driven by the counsel we received from the Department of Justice.

Our review was initiated based on prior audits and information received from a variety of sources. I might point out that although all of these sources expressed concern regarding favoritism or possible payoffs to influence the allocations, none were able to furnish any evidence to support their concerns. We pursued each of the leads provided by those individuals during the course of our audit and investigation.

Because HUD had no systematic way of identifying developers, consultants, and lenders involved in the program, our audit staff began by developing a questionnaire which was sent to the Public Housing Authorities receiving funding for 25 or more units. That information, combined with the information we had received previously, allowed us to target our efforts.

Based on the results of our audit, we concluded there was little assurance that housing was provided to those areas having the greatest need. Further, there was minimal or no documentation or accountability for PHA's selected by headquarters to receive funding allocations. Moreover, PHA's selected developers without complying with the need for an effective competitive selection process and often in violation of their own administrative plans.

We found that only about 204 of the approximately 3,000 PHA's received funding allocations during the 5-year period; that 10 States received 51 percent of all units, whereas their fair-share allocation would have been about 16 percent; that 15 PHA's received four or more allocations each during the period, representing over 33 percent of all units allocated; and that former HUD officials and employees actively sought and participated as developers, consultants, or lender representatives in at least 55 projects.

In addition to those conditions, we also found that in 19 projects, the developers approached the PHA's claiming if the PHA's applied for units, an award would probably be made to them; that in 25 projects, the developers paid consultants, some of whom were former HUD officials, for services that equated to lobbying HUD officials on the developer's behalf; and that in 49 projects, the ultimate awards made by HUD or the PHA's closely approximated the number of units owned or controlled by a specific developer.

All of these conditions fostered a widespread perception among PHA officials that HUD's selection process was not governed by the regulatory criteria.

While the audit was in process, we also began an investigation. That action was based on the apparent allocation of units to specific projects or developers, some of whom were former HUD employees; the payment of substantial fees, up to $1,500 per unit by developers to consultants, including former HUD employees, for assistance in obtaining the units; the apparent access to inside information by former employees; and the contributions by other participants to a charitable organization then supported by Assistant Secretary Thomas Demery.

INSPECTOR GENERAL INVESTIGATION DISCLOSURES

Our investigation disclosed a definite perception that favoritism existed in the allocation process. Contributing to this perception were the frequent instances in which the units awarded coincided with the specific number of units proposed by certain developers.

Our interviews of PHA officials and others also indicated that it was their perception that developers were being awarded units as a result of fees paid to consultants, including the former Special Assistant to the Secretary, who received over $1.3 million; the former Deputy General Counsel, who received $282,500; and a former Deputy Assistant Secretary for multifamily housing who received $420,000, among others.

We also found instances where the developers received information about the allocation of units before the PHA's were notified.

As concerns the contributions to the charitable organization, we discovered one of those while reviewing a developer's records and subsequently in the process identified some additional $290,000 contributed to that organization between January 1986 and 1988. We believe that amount represents about 50 percent of the funds raised by that organization during the same period.

While we have no basis to question the purpose of the organization, we were concerned because of Mr. Demery's support of that organization prior to becoming HUD Assistant Secretary and the appearance that he might have been favoring individuals contributing to that organization.

NO EVIDENCE OF CRIMINAL WRONGDOING

Concerns have been expressed regarding my statement that I found no evidence of criminal wrongdoing. While the situation described in our audit and investigation provide cause for indignation, the Public Integrity Section of the Department of Justice in its preliminary decision concluded that the underlying facts did not indicate any apparent violation of the Federal criminal statutes.

However, I would remind everyone that both the Public Integrity Section and the Office of Government Ethics are presently conducting a comprehensive review of our efforts and we will await further guidance from them.

I might point out that we have devoted some 15.5 staff years to the audit work and some additional 2.5 staff years to the investigation.

Secretary Kemp very early took a very active interest in the organization and, immediately upon arriving at HUD, requested that I brief him concerning ongoing audits and investigations of any significance. I provided him with the details we had developed at that time.

Secretary Kemp has since sent memorandums to top program managers in the field and headquarters to summarize the problems we identified, and has explained his commitment to taking corrective actions. I'm very encouraged by that action and I believe his actions are appropriate at this time. We look forward to working with him to address the problems in the program.

That concludes my prepared statement, Madam Chair, and I'll be glad to respond to any questions.

Senator **Mikulski**. Thank you very much, Mr. Adams.

We're scheduled to receive Secretary Kemp early within the next 30 minutes. We're going to hold our questioning to you to about 30 minutes or less. We're going to proceed under the 10-minute rule for us on this.

Let me go right in, therefore, to my questions, and my first question is this.

DEPARTMENT OF JUSTICE REVIEW OF HUD INSPECTOR GENERAL AUDIT

You talk about the other Government agencies that are now involved in reviewing this situation. Have any of these activities that you've uncovered been referred for criminal investigation or prosecution?

Mr. **Adams**. The Public Integrity Section of the Department of Justice is reviewing the results of our audit and investigations to determine whether or not there are any criminal violations that we did not perceive.

Senator **Mikulski**. That's the normal process: If you think that criminal charges should be filed they go to Justice and Justice determines whether they should be filed?

Mr. **Adams**. That's correct.

Senator **Mikulski**. Is that correct?

Mr. **Adams**. That authority is vested with the Department of Justice.

Senator **Mikulski**. Do you have any idea when Justice will complete their evaluation?

Mr. **Adams**. No, Ma'am; we have a continuing dialogue with them and we will continue providing information as they so ask.

Senator **Mikulski**. Have they set a deadline?

Mr. **Adams**. No, Ma'am; not to my knowledge.

Senator **Mikulski**. When did the subject of excessive use of consultants and possible unsavory activity first come to your attention?

USE OF CONSULTANTS

Mr. **Adams**. As concerns the use of consultants, I believe our first discovery on the use of consultants occurred in April 1988 and we followed that lead throughout the continuation of our audit and investigation.

Senator **Mikulski**. A Washington Post story that came out on April 27, 1989 says that these abuses have been going on for as much as 5 years.

Would you care to comment on that?

And then also why an inspector general wasn't more aware of that if this has been going on for 5 years?

Mr. **Adams**. We did find some consulting payments going back, I believe, as far as 1984, Madam Chair. As part of the process, as I mentioned earlier, it was very difficult for us to identify the consultants and that was only discovered through individual interviews of the developers themselves.

There had been one other earlier complaint concerning the use of consultants. We did some investigation work in the latter part of 1986 and did not discover anything at that time.

Senator MIKULSKI. How did this come to your attention?

Mr. ADAMS. We had received some recurring rumors and we had also done some earlier audit work concerning excess assistance payments.

Senator MIKULSKI. I don't want you to reveal your sources or whatever, I'm interested in the process and also want to be sure that you have the resources to do your job.

To be more clear, Mr. Adams, did this come through a whistleblower or did this come from routine audits performed by an inspector general as part of the functions of your duties?

Mr. ADAMS. Based on some of the rumors and speculations we had heard, we had programmed some audit work and that's how we began this process in the early part of 1988 when we started gathering background information. Subsequently, we received some information from a couple of sources on the House side and we pursued those also.

Senator MIKULSKI. So you had some rumors, some tips, some whistleblowing——

Mr. ADAMS. Yes, Ma'am.

Senator MIKULSKI [continuing]. And then you pursued them.

HUD INSPECTOR GENERAL AND RESOURCES TO DO THE JOB

Do you have enough resources to do the job of inspector general at HUD?

Mr. ADAMS. I believe I do, Madam Chair.

Senator MIKULSKI. And you have enough financial and staff resources?

Mr. ADAMS. We work very closely with Mr. Kliman and his staff. This will be the first year we've had a separate appropriation. Mr. Kliman has worked very closely with us to effectuate that as part of the Inspector General Act amendments and we believe that we do have adequate resources.

Senator MIKULSKI. All right.

It has been my observation that the inspector general, of course, not only at times identifies fraud and abuse—which, of course, we welcome and will ferret out of our Government— but often an inspector general, because of their approach through auditing functions, often comes up with very sloppy management identification—for example, here even in this you talked about the lack of clarity in the regulations—and we think that's a very important tool to the Secretary to be able to do that.

So we're absolutely committed to the inspector general and that's why we want to be sure you have the resources that you need to be a HUD watchdog.

Mr. ADAMS. I couldn't agree with you more. In fact, you might note that the audit portion of our staff is about 350, out of the 490 people, we have in the Office of Inspector General. I think that's a reflection of the emphasis we place on the audit function.

Senator **Mikulski**. Are there any other kinds of investigations of HUD programs which you are undertaking at this time that you could share with us? Do you have investigations—one that you could share with us?

No. 2, are there those that you prefer not to comment upon but that there are other ongoing investigations?

Mr. **Adams**. We would prefer not to comment on ongoing investigations, Madam Chair, because it might jeopardize the success of those.

Senator **Mikulski**. I understand.

RECENT NEWSPAPER ARTICLE ON FLEXIBLE SUBSIDY AUDIT

Mr. **Adams**. I might just comment on a couple of things that have come out recently. I think the Washington Times had written an article which may have created a little bit of confusion. That article refers to our flexible subsidy audit and our loan management set-aside audit as forthcoming. Both those reports were issued much earlier in the year and I'm not sure what caused the confusion with respect to those. Both audits did identify some systemic weaknesses and those have been addressed and are in the process of being addressed by the Department.

Senator **Mikulski**. So are you looking at the flexible subsidy program?

Mr. **Adams**. We have completed our work with regards to the flexible subsidy program. That report was issued in November of last year.

Senator **Mikulski**. Can I come back to the moderate rehabilitation?

CONSULTANTS FEES

Have you identified how much was paid out in consultant fees on the projects you've investigated and what were the most excessive examples of these fees?

Mr. **Adams**. We have a figure. I just don't have it at my fingertips at the present. I'll submit it for the record if I might, Madam Chair.

[The information follows:]

Moderate Rehabilitation Program Consultant Fees

Payments to consultants involved in the Moderate Rehabilitation (Mod Rehab) program ranged from $500 to $1,500 per unit. Two of the more excessive fees involved the payment of $300,000 to James Watt on behalf of Kingsley Park Apartments in Essex, Maryland and $100,000 to Joseph Strauss for West Dale Ltd., Miami, Florida.

Our records indicate that consultants received the following fees for their efforts associated with the Moderate Rehabilitation program:

Joseph Strauss	$1,305,875
Rick Shelby	442,000
Michael Karem	420,000
Louis Nunn [1]	375,000
Judith Siegel	474,000
James Watt	300,000
Gerald Kisner	282,500
Fred Bush & Co. [1]	260,000
Edward Brooke	183,000
Rick Price	125,149

R. Carter Sanders	107,000
Ronald Gatton	84,000

[1] $65,000 outstanding balances.

USE OF CONSULTANTS

Mr. **Adams**. The fees range from $500 per unit to $1,500 per unit.

Senator **Mikulski**. First, was the use of consultants normal and customary practice of doing business?

Mr. **Adams**. It seems to have been a lot more usual than I had anticipated in the process and I'm not sure that there is really a need for consultants in the process. It seems to me the system was relatively simple and I'm not sure there was an inherent need for consultants.

Senator **Mikulski**. So the consultants just seem to have been hired to be sure as to get the contract, is that right?

Mr. **Adams**. I believe so. They created a perception among the people they were employed by that there was a need for them.

Senator **Mikulski**. There was also a perception on the part of the developer that they needed a person like that to get on track and get their project through, is that correct?

Mr. **Adams**. That's correct.

Senator **Mikulski**. So there was a perception at the HUD field offices and headquarters themselves that you needed to have someone be a known advocate within those field offices, is that right?

Mr. **Adams**. The decisions were not made at the field office level, they were made at the headquarters level.

Senator **Mikulski**. But you had to get through field. And when you looked at your audits—through your audits, didn't you find that the whole process at the field office was sometimes uneven, sloppy, and confusing?

Mr. **Adams**. At the beginning of 1984 when 213(d), which was the fair share requirement, was waived, most of the applications were submitted directly to headquarters until the middle of 1988. The applications were made to headquarters and headquarters made the decisions and the allocations.

Senator **Mikulski**. I understand that there could be as much as $400 million in these fees, is that correct?

Mr. **Adams**. That is an estimate of the overpaid assistance that we made.

HUD'S EFFORTS TO RECOVER OVERPAYMENTS

Senator **Mikulski**. $400 million is a lot of money in this HUD budget we're working on. Is there a plan to recover these overcharges?

Mr. **Adams**. Yes, the Secretary has asked the Assistant Secretary for Housing to review all of those. We audited 20 projects and found $58.8 million. We estimate that the additional projects might have as much as $413 million. Those 300 projects are presently being looked at by Housing, with some assistance from us, to determine the full magnitude of those overassistance payments.

Senator **Mikulski**. We'll be talking with Secretary Kemp about that.

I have some additional questions. I'll submit them, for the record.

Senator Garn.

Senator **Garn**. Thank you very much, Madam Chair.

I just have one general question. Obviously, the issue of criminal charges is not within your jurisdiction; as you've testified that's the determination of the Justice Department. So from a policy standpoint have you made or are you going to make recommendations as far as how procedures applicable to this whole—not just in moderate rehabilitation but in general—will be made to correct this sort of thing in the future?

In other words, you've done your audit and are aware of what has taken place. What specific recommendations do you have?

INSPECTOR GENERAL RECOMMENDATIONS

Mr. **Adams**. There were a series of, I believe, 21 recommendations in our audit report, Mr. Garn. The Department has fully accepted 19 of those and there are two others that we are still having discussions on. Those two additional ones are very complicated issues. One in particular deals with the factoring in of the tax credits in computation of the assistance payments and what an appropriate level of assistance might be. That's the subject of some ongoing discussion.

The second one that's unresolved is we believe that there should be a definition of what moderate rehabilitation is dollarwise. We found instances in which the rehabilitation went as high as $80,000 a unit in some locations. And our auditors do not believe that is moderate rehabilitation, that is rather substantial rehabilitation.

Senator **Garn**. I guess what I'm really driving at is let's assume that there is nothing illegal—we've talked a great deal about perception and certainly at the very best the perception is very, very bad.

So beyond the specifics—the reason I'm asking this question, my son is a CPA, so I know what kind of information you get from auditors and sometimes it's very, very specific.

Maybe I'm going beyond questions I should ask you and should ask the Secretary. I'm dealing with broader policy issues, I suppose, that even go beyond moderate rehabilitation in HUD. I have been involved with HUD now for nearly 25 years and I guess my question goes beyond auditors and more to the general policy of how we get at the whole problem of HUD. I'm opening up a huge can of worms that I suppose is beyond what you should be responsible to answer.

LEGISLATING CONSULTANTS

Mr. **Adams**. A couple of things quickly come to mind, Senator Garn. One is that we suggested that the Secretary of the Department consider some legislation as concerns consultants. They might use, as at least a discussion point, the recently enacted Procurement Integrity Act (Public Law 100-699; section 27), which addresses the question of consultants.

We believe that if there is to be a consultant present in the process, that that should be publicly known and should not be something which is kind of behind the scenes. The Department and others should be aware of the role of the consultant in the situation.

We also suggested that the Department basically comply with existing regulations as concerns the allocation process, and that it be a fair and open process. The Secretary has taken action already along those lines.

Senator **Garn**. Well, thank you. I'll reserve the balance of my questions because they really are going beyond your job description and get into this more with the Secretary.

Thank you, Madam Chair.

Senator **Mikulski**. Senator Fowler.

Senator **Fowler**. Thank you, Madam Chair.

I want to commend the inspector general, the only man that I've heard testify who says he has adequate resources to operate his shop; you are to be commended.

Mr. **Adams**. I may regret that statement at some point, Mr. Fowler.

Senator **Fowler**. We appreciate starting from that perspective anyway.

Let me just follow the line of questions for information that both the chairman was asking and Mr. Garn. I haven't read your whole report, but I want to. What are your conclusions from your report in your appendix D and F on consulting, and especially consulting and developing by former high-ranking officers at HUD?

PERCEPTION OF FAVORABLE ACCESS

Mr. **Adams**. They were able to at least create the perception that they had some entree into the process and thereby provide their customers some access, some favor in the process.

Senator **Fowler**. I take it there are no either rules of the Department or laws of the land that prohibit—whether there's any time delay like we had in others, members of Congress, for instance, to be active in the business that they were heretofore regulating?

Mr. **Adams**. Those same laws apply to the HUD employees, I believe, and that appears at section 208 of title XVIII, the post-employment conflict of interest provisions.

I would just point out that in these situations the former employees in many instances did not come back before the Department, but that they were serving as consultants to the developer.

Senator **Fowler**. What about the developer himself? I see we had a Regional Director for Housing Management develop 20 projects, own and develop 20 projects.

Mr. **Adams**. We looked very closely at that in relationship to the different provisions of title XVIII, section 208, and found that all those things occurred after the lapse of the prohibited period.

NO POST-EMPLOYMENT CONFLICT OF INTEREST

Senator **Fowler**. I take it your conclusion in that case was that there had been nothing illegal done, but that raised a flag that the law ought to be tightened?

Mr. **Adams**. We made no specific recommendations with regards to the post-employment conflict of interest provisions; no, sir.

Senator Fowler. Is that because it's not in your bailiwick or you made the decision not to make a recommendation?

Mr. Adams. Yes, sir; that's correct, we found no basis to make any recommendations in that regard.

Senator Fowler. What is the law? What is the waiting period, 1 year?

Mr. Adams. In some situations, 1 year, some in 2 and sometimes a lifetime bar, and it comes incrementally.

Senator Fowler. What is it in this one?

Mr. Adams. Basically it prohibits you from appearing before the Department within 1 year following your resignation in connection with any matter.

Senator Fowler. But you can consult?

Mr. Adams. Right.

Senator Fowler. That's the way you get around that.

Mr. Adams. Correct; 2 years in any matter which was under your supervision, and a lifetime bar on anything in which you had a direct and substantial role.

Senator Fowler. On what basis have you concluded that you will not make recommendations as to how to tighten that?

Mr. Adams. That's the post-employment conflict of interest provisions?

Senator Fowler. Yes.

Mr. Adams. We just did not perceive that as being part of the issue at this time.

Senator Fowler. What is the issue?

In other words, you're speaking language terms. I'm just looking at your—in other words, your office has concluded that—I know you've concluded technically that there are no violations of the law.

What you're saying, unless you say otherwise, is you've concluded that to have all of these assistant secretaries, Executive Assistants to the Secretary, Special Assistants to the Secretary, Deputy Assistant to the Secretary for Housing, Deputy General Counsel, Regional Administrators immediately go out and become consultants and make in some cases $1 million or $2 million in conculting fees, presents no conflict of public interest in the operation of our housing and resources for the country, is that correct?

Mr. Adams. It creates a perceptional problem, Mr. Fowler, I'll have to defer to the Department of Justice on whether or not they think there's a violation.

Senator Fowler. It doesn't disturb—I don't know. Are you saying that you have no authority to change the law?

Mr. Adams. That's correct, sir.

Senator Fowler. But you do have authority to recommend as inspector general that you see impropriety in this, do you not?

Mr. Adams. Yes, sir.

Senator Fowler. Why have you chosen not to do so?

Mr. Adams. The Procurement Integrity Act, which I referenced earlier, does have some specific provisions which, in part, address your concerns and we did recommend that they consider that as part of the process prospectively.

REQUEST FOR FOLLOWUP CORRESPONDENCE

Senator **Fowler**. Just in case we're not communicating, due to my lack of specificity, I would appreciate a follow-up letter from you as to what you concluded by this investigation and all resources, if any, both in your shop and in the rest of the Government as to what we should do about it.

Mr. **Adams**. Will do, sir.

Senator **Fowler**. Thank you, Madam Chair.

Senator **Mikulski**. I think that Senator Fowler's questions have been excellent. I would like to commend him. I would request that a copy of your response to him also be sent to us as part of our record in today's proceedings on this issue.

[The information follows:]

Investigation into the Allocation of 1989 Moderate Rehabilitation Funds

The following material was provided to the Committee in response to Senator Fowler's request for further recommendations on tightening post-employment restrictions.

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
WASHINGTON, D.C. 20410-4500

May 30, 1989

Honorable Wyche Fowler, Jr.
United States Senate
Washington, D.C. 20510

Dear Senator Fowler:

This is in response to your request at the Hearing of May 16, 1989 before the Senate Appropriations Subcommittee for VA, HUD and Independent Agencies. You asked for my conclusions about what the government should do about the situations disclosed in our reports on the Moderate Rehabilitation Program. You were particularly interested in how post-employment restrictions could be tightened to prevent former HUD employees from enriching themselves through HUD programs after they left the Department.

Our primary recommendations to correct the selection process and subsequent subsidy determinations were contained in our audit report and are enclosed with this letter as Enclosure A. The Department has concurred in all but two of these recommendations and is taking effective action. We are still discussing with HUD officials recommendations 6 and 7 regarding the definition of moderate rehabilitation and the tax credit issue. We believe that HUD should recognize the value of low-income housing tax credits in the rent calculations and, thereby, reduce the subsidies paid on assisted projects. We further recommend that HUD define moderate rehabilitation in terms of dollars and/or scope limitations on eligible rehabilitation costs, in order to contain costs within reasonable limits.

Another set of recommendations to curb abuses by consultants and former employees were included in the memo transmitting our investigative report to Secretary Kemp (See Enclosure B). These recommendations were modeled after the new restrictions on procurement officials, contractors, and consultants contained in the "Office of Federal Procurement Policy Act Amendments of 1988," Public Law 100-679. Section 27(e) of the Act strengthens post-employment restrictions on former officials and employees, and prohibits them from participating in any manner in the award, modification, or extension of any contract or procurement in which they either participated personally or substantially in the conduct of the procurement, or personally reviewed and approved the award, modification, or extension.

I believe the Congress should consider similar type restrictions for former HUD employees who have participated in programs involving loans, grants, insurance, and subsidies. However, for such restrictions to reach to the kinds of situations found during our investigation, they would have to be broader and of a longer duration. For instance, the restrictions would need to prohibit participation in all programs previously under the general supervision of the former employees and to extend 5, 10, or 15 years. I realize this type of restriction will be burdensome to former officials and controversial, but I think that if the Congress wants to prevent the type of enrichment we found during our investigation, it must look toward a solution within this broader context.

If you have any questions please call me on 755-6430.

Sincerely,

Paul A. Adams

Paul A. Adams
Inspector General

Enclosures

cc:
Senator Barbara A. Mikulski
Senator Jake Garn

ENCLOSURE A

Audit of Section 8 Moderate Rehabilitation Program

Recommendations

We recommended in our report that HUD:

1 Establish a revised selection process that incorporates the appropriate regulatory criteria and provides for documentation and accountability for resultant funding decisions.

2 Disseminate a memorandum to all Public Housing Authorities (PHAs) that received fund allocations but have not yet executed HAP contracts governing the allocations. The memorandum should contain instructions to delay contract execution until HUD is assured that HUD requirements were met and contract rents are correct.

3 Develop and implement a work plan including needed staffing and milestones to review and revise as needed the regulations and Handbooks governing the Moderate Rehabilitation Program (MRP).

4 Establish systems and staffing patterns to deal consistently with issues raised in our external audit reports that were, or will be, issued and which have a material dollar impact on short and long term Section 8 subsidies and possibly on the value of many coinsured mortgages.

5 Issue clear guidance for use by HUD, PHA, and Coinsured Lender staffs regarding roles and specific procedures for calculating base and contract rents for MRP projects that will be coinsured under HUD's insurance programs.

6 Develop, disseminate, and monitor implementation of policies and procedures that require the determination and recognition of low-income housing tax credits in MRP rent calculations.

7 Develop and implement a definition of moderate rehabilitation that

includes dollar and/or scope limitations of eligible rehabilitation costs.

8 Develop specific clarifying guidance regarding the determination of project feasibility for projects consisting of converting non-residential structures to MRP units.

9 Prepare and disseminate, as guidance in calculating rents, explanations and examples of the proper treatment of several common but troublesome issues that have a significant dollar impact on rents as discussed above or in Findings 3, 4, and 5 of the report, such as (1) the use of shorter than actual rehabilitation loan terms, (2) the inclusion of ineligible units in the MRP, (3) the inclusion of ineligible costs, etc.

10 Establish a staff allocation plan for dealing with the PHA problems identified during our audit and for reviewing other projects at those PHAs and other PHAs participating in the MRP. The staff should be instructed to develop methods and criteria to complete needed reviews and to take appropriate actions to affect recovery of overpaid assistance and to amend HAP contracts to limit future overpayments.

11 Develop appropriate training packages that highlight common problem areas noted in the reviews recommended above and assure that the problems do not recur.

12 Issue an appropriate directive to all PHAs explaining the steps to be taken in 10 and 11.

13 Analyze current MRP workload in relation to Field Office staffing patterns and develop a prioritized action plan together with needed staff levels at Headquarters and Field Offices to accomplish an effective review of past MRP projects and assure prospective improvements in HUD's oversight function.

14 Develop appropriate training materials and methods that will assure that Field Office staff become proficient in monitoring PHA MRP activities. At a minimum the following specific matters need attention: (1) project selection procedures and initial feasibility analysis, (2) base and contract rent calculations, (3) distinction between eligible and ineligible units, (4) distinction between eligible and ineligible costs, (5) roles and responsibilities when MRP projects are coinsured, and (6) preparing and documenting cases for taking sanctions when serious noncompliance is evident.

15 Develop and issue a directive to Field Office Managers and staff regarding a renewed emphasis on overseeing the MRP. Such a directive should at a minimum provide for (1) a monitoring visit and rent calculation review for all projects funded since October 1, 1984 that consist of 50 or more units and were not included in our audit, (2) priority attention to resolving all audit findings on a consistent basis whenever decisions at Field Office levels are appropriate, (3) the timely initial monitoring of all PHAs receiving funding allocations in Fiscal Years 1988 and 1989, and (4) follow-up reviews to assure that appropriate sanctions were, or will be, taken for those PHAs included in our October 1985 audit memorandum or the Headquarters' directed review of 43 projects in 1986.

16 Establish, in conjunction with the Deputy Under Secretary for Field Coordination, appropriate methods to monitor and measure the effectiveness of future Field Office monitoring of the MRP.

17 Develop, and issue, as practical guidance for HUD staff, PHA staff and Coinsured Lender staff, clear instructions outlining specific roles and procedures for processing MRP projects that will be coinsured under 223(f) or 221(d)4.

18 Establish criteria, or specific limitations, to guide HUD staff in determining the maximum Section 8 subsidies HUD is willing to absorb in funding a coinsured MRP project.

19 Develop revised cost controls for the coinsurance programs when the project involves the Section 8 MRP. Considerations should be given to requiring (1) Field Offices to verify the coinsurer's rent comparability analysis and (2) Field Office review of the cost certifications provided by mortgagors and contractors.

20 Establish needed controls over identity of interest situations that are compatible and effective for both coinsurance and for MRP projects.

21 Develop a strategy, and related work plan, for taking the necessary steps to (1) recover excess subsidies paid, (2) reduce the contract rents and related mortgage amounts for the fourteen projects reviewed during our Benton Mortgage Company audit, and (3) review all other coinsured MRP projects and take the same steps as in (1) and (2) when appropriate.

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
WASHINGTON, D.C. 20410-4500

April 17, 1989

MEMORANDUM FOR: Secretary Kemp, S

FROM: Paul A. Adams, Inspector General, Z

SUBJECT: Allocation of Section 8 Moderate Rehabilitation Units

The enclosed completed Report of Investigation represents the second piece of our review of the allocation of Section 8 Moderate Rehabilitation units. Our earlier audit concluded that program was generally poorly managed and that there was little or no documentation or accountability for funding decisions. The audit made recommendations as to the action needed. Both you and the Office of the Assistant Secretary for Housing-Federal Housing Commissioner have responded to our recommendations and many of the recommended actions have already been initiated.

While we found no evidence of criminality, our investigation did reveal a growing public perception of favoritism. Factors contributing to this perception included:

-- apparent allocation of units to specific projects or developers;

-- certain developers/owners, including several former HUD employees, received a substantial number of the units in certain areas;

-- consultants, including several former HUD employees, received substantial fees--up to $1,500 per unit--from developers for assistance in obtaining allocation of units, with a former Special Assistant to the Secretary receiving $1,300,000;

- -- apparent access to inside information and/or advance notification of allocations as well as other internal proceedings by former HUD employees and developers; and
- -- significant contributions by participants in the Mod Rehab and/or other HUD programs to F.O.O.D FOR AFRICA (FOOD), a non-profit charity supported by the Assistant Secretary-Federal Housing Commissioner Thomas T. Demery. We were able to identify some $290,554 or approximately 50 percent of the amount donated between January 1986 and December 1988 as being contributed by individuals or firms known to be involved in the various programs administered by Demery.

While resolution of the audit recommendations will address some of the issues, the investigation raises additional matters warranting consideration. These include the role of consultants in HUD programs; access by former HUD employees and others to inside or advance information regarding allocations and/or other internal proceedings; and the role of Thomas T. Demery, then Assistant Secretary-Federal Housing Commissioner, in the fundraising activities of F.O.O.D. All of these issues need to be considered as part of any overall program to eliminate the perception of favoritism.

As concerns consultants, some public housing authority officials and developers were led to believe the consultants enjoyed a special relationship with persons making recommendations and decisions and, therefore, could assure allocation of desired units. This was reinforced by events, such as notice by the consultant to the developer of an allocation prior to notification of the local HUD office by Washington. Some of the consultants acknowledge their services were limited to facilitating contacts and meetings with HUD officials; whereas, others claim to have provided substantive assistance in the development of projects and related applications. Consultants may be justified in some instances, however, I am concerned that developers and the public not be led to believe that employment of a consultant is required in order to obtain an allocation. There also should be some relationship between the fee charged and service rendered.

In some ways, the issue of consultants is similar to the problems recently experienced by the Defense Department involving procurement. In Defense, the contractors were paying consultants to obtain information to influence contract awards. At HUD, the developers were paying consultants to influence awards of moderate rehabilitation units to public housing authorities. The difference between the two situations is that the investigation at Defense was able to prove that the consultants paid government employees for information and for selecting a particular contractor. Our investigation at HUD was unable to substantiate that government employees received any financial consideration from the consultants. Nevertheless, the Government's response to the scandal at Defense may be instructive as to steps that HUD could take to address the issue. I have attached a copy of the new Law passed in November 1988 and my own analysis of how this approach might be adapted to the circumstances at HUD. I suggest that the General Counsel's office review this material and determine whether this approach, or some other method, will cure the problem at HUD.

The former General Counsel rendered an earlier opinion based on our preliminary investigation that Mr. Demery's participation in the F.O.O.D. fundraising activities did not represent a violation of the Standards of Conduct or the criminal statutes. Since the investigation has now been completed, I would recommend that the Office of General Counsel reassess the matter and provide you appropriate recommendations.

Pursuant to an earlier request, a copy of our Report of Investigation has also been provided to the Public Integrity Section, Criminal Division, Department of Justice, for review and consideration. Based on periodic briefings by our investigators, Public Integrity Section earlier found no apparent violations of the criminal statutes but requested they be provided a copy of the completed Report of Investigation for the purpose of a more comprehensive evaluation.

Also enclosed are Disposition Report forms for your use in reporting the action taken in this matter. Please execute and return to me two copies of this form.

Enclosures

ENCLOSURE B

Application of the "Procurement Integrity" Approach to HUD Programs

In November 1988, Congress passed PL 100-679, "Office of Federal Procurement Policy Act Amendments of 1988." Section 27 of that Act addressed "Procurement Integrity" and placed new restrictions on competing contractors, or any officer, employee, representative, agent, or consultant of any competing contractor. This section of the Act was a Governmentwide response to the procurement scandal found in the Department of Defense.

The new law prohibits direct and indirect payments, promises of future benefits or payments, and solicitation of proprietary or source selection information between contractors and government procurement officials. If such payments, promises, or solicitations are made, the Law requires disclosure by the contractor and procurement officials. The Law also requires positive certification by contractors and procurement officials that such payments, promises, and solicitation have not been made, if none have been disclosed. It also prohibits government officials and employees, who have participated personally and substantially in a procurement, from participating as an employee, agent, or representative of the contractor with regard to that procurement for 2 years after leaving government service. There are administrative, civil, and criminal penalties for violation of this law. Administratively, the Agency can terminate the contract and/or impose sanctions on the contractor. Civil penalties are $100,000 per individual and $1,000,000 per contractor. Criminal penalties can go as high as 5 years in jail and/or a fine.

The following is an attempt to set forth similiar prohibitions applicable to all HUD Programs in the format used in the "Procurement Integrity" Section of the Act:

Prohibited Conduct by Participants in HUD Programs

During the conduct of any process by the Department of Housing and Urban Development, to determine the recipient of a grant, loan, subsidy, or other program funded by the Department of Housing and Urban Development no competing participant, nor any officer, employee, representative, agent, or consultant of a competing participant, shall knowingly --

(1) pay a fee, promise to pay a fee, offer a business interest or opportunity, offer indirect payments or fees to any employee of the Federal Government,in order to influence a selection decision with respect to a program funded by the Department of Housing and Urban Development.

(2) pay a fee, promise to pay a fee, offer a business interest or opportunity, offer indirect payments or fees to any third

party for the purpose of influencing a selection decision with respect to a program funded by the Department of Housing and Urban Development.

(3) make, directly or indirectly, any offer or promise of future employment or business opportunity to, or engage, directly or indirectly, in any discussion of future employment or business opportunity with, any Federal official with the purpose of influencing a selection decision with respect to a program funded by the Department of Housing and Urban Development.

(4) offer, give, or promise to offer or give, directly or indirectly, any money, gratuity, or other thing of value to any Federal official, or to any other entity with the purpose of influencing a selection decision with respect to a program funded by the Department of Housing and Urban Development.

(5) solicit or obtain, directly or indirectly, from any officer or employee of the Department of Housing and Urban Development, prior to the selection of a participant, any unauthorized advance information with respect to the selection process or to the selection decision.

Prohibited Conduct by Officials who Select Participants for HUD Programs

During the conduct of any process by the Department of Housing and Urban Development to determine the recipient of a grant, loan, subsidy or other program funded by the Department of Housing and Urban Development no Federal official involved in the selection process shall knowingly --

(1) solicit or accept, directly or indirectly, any promise of future employment or business opportunity from, or engage, directly or indirectly, in any discussion of future employment or business opportunity with, any officer, employee, representative, agent, or consultant of a prospective participant.

(2) ask for, demand, exact, solicit, seek, accept, receive, or agree to receive, directly or indirectly, any money, gratuity, or other thing of value from any officer, employee, representative, agent, or consultant of a prospective participant.

(3) disclose any unauthorized advance information with respect to the selection process or to the selection decision.

The above prohibitions should be coupled with appropriate disclosures, certifications, and penalties.

Senator **Mikulski**. Senator Fowler, what we talked about was the need for a watchdog that, No. 1, stands sentry, No. 2, that barks, and bites. And that's what we hope to have from our inspector generals in all of our offices.

Today, we would like to also welcome Senator Brock Adams, another member of the Appropriations.

Senator Adams, today we've been talking the first part of this to our inspector general, particularly on the moderate rehabilitation issue. We welcome you and know you have some keen interest in some of the issues affecting public housing.

Did you also want to take a minute with the inspector general?

Senator **Adams**. No; thank you very much, Madam Chairman. I very much appreciate the opportunity to be here. I would like to ask one or two questions of the Secretary at an opportune moment, but I have no questions for the counsel and thank you for letting me attend.

Senator **Mikulski**. Thank you for being here, because we know of your keen interest in the District of Columbia and the drug problem.

Senator **Adams**. That, too.

Senator **Mikulski**. Mr. Adams, thank you very much for being here. As you can see, we have some questions for the record. We also look forward to your response to Senator Fowler.

Is there any other point you want to make as we wrap up?

Mr. **Adams**. I don't believe so, Madam Chair.

Senator **Mikulski**. Thank you very much.

OFFICE OF THE SECRETARY

STATEMENT OF JACK KEMP, SECRETARY

ACCOMPANIED BY:

MARY BRUNETTE, ASSISTANT TO THE SECRETARY FOR POLICY AND COMMUNICATION

CAROLYN LIEBERMAN, DEPUTY GENERAL COUNSEL

JAMES E. SCHOENBERGER, GENERAL DEPUTY ASSISTANT SECRETARY FOR HOUSING, AND DEPUTY FEDERAL HOUSING COMMISSIONER

THOMAS SHERMAN, ACTING GENERAL DEPUTY ASSISTANT SECRETARY FOR PUBLIC AND INDIAN HOUSING

LOUIS GASPER, EXECUTIVE VICE-PRESIDENT, GOVERNMENT NATIONAL MORTGAGE ASSOCIATION

ANNA KONDRATAS, SPECIAL ADVISOR TO THE SECRETARY FOR COMMUNITY PLANNING AND DEVELOPMENT

THOMAS HUMBERT, DEPUTY ASSISTANT SECRETARY FOR POLICY DEVELOPMENT, OFFICE OF POLICY DEVELOPMENT AND RESEARCH

THOMAS CASEY, GENERAL DEPUTY ASSISTANT SECRETARY FOR FAIR HOUSING AND EQUAL OPPORTUNITY

DONALD J. KEUCH, JR., DEPUTY ASSISTANT SECRETARY FOR ADMINISTRATION

TIMOTHY COYLE, ASSISTANT SECRETARY FOR LEGISLATION AND CONGRESSIONAL RELATIONS

PATRICIA CARLILE, EXECUTIVE DIRECTOR, INTERAGENCY COUNCIL ON THE HOMELESS

ALBERT J. KLIMAN, DEPARTMENTAL BUDGET OFFICER

NEHEMIAH PROGRAM REGULATION PROBLEM

Senator **MIKULSKI**. The Chair now welcomes back to the subcommittee Secretary Kemp. Yesterday, we had a most vigorous hearing in which we covered some major housing goals, modernization for public housing, issues pertaining to the homeless, and some of the other most pressing issues.

Secretary Kemp, we welcome you back today and I would like to move into some of the questions on moderate rehabilitation. But before I do, yesterday we talked about Nehemiah. Could you tell me essentially what OMB finally concluded on Friday in retrospect to those rules and regulations?

Secretary **KEMP**. I'll be happy to.

Senator **MIKULSKI**. Have we solved the Nehemiah regulation problem?

Secretary **KEMP**. I am pleased to announce, Senator Mikulski, Madam Chair, and also to the distinguished ranking Republican, Senator Garn, that our efforts, thanks in large part, Madam Chair, to you and the progress that we made since suggesting that contiguousness in terms of Congress' response to the Nehemiah program would be interpreted in a way that would give some flexibility to those neighborhoods and communities that you and I saw personally in Baltimore and I'm pleased that Friday, OMB responded favorably to our request for the type of a regulation that would allow for that type of Nehemiah project. So I'm very pleased to announce that they have agreed with us and we have agreed with you and I think now we can go forward with the right type of a Nehemiah project.

Senator **Mikulski**. Well, thank you very much, Mr. Secretary. We appreciate the fact that the regulations have defined the word contiguous to mean within the same neighborhood, as compared to literally next door to each other.

Secretary **Kemp**. May I just add I want to pay a special tribute to the people of HUD who helped come up with, I think, an innovative solution to what was a vexing problem for some of the Nehemiah projects that are planned and I'm very pleased that our people did such a terrific job in coming up with this type of regulation. Even OMB agreed with it.

Senator **Mikulski**. What we hope to be able to do is not only build housing but build communities, and this definition helps do that.

Will the grants be available by July 1?

Secretary **Kemp**. We want to make—the answer is yes. I was going to say we want to make them available by July 1, but I'm told that we can, so let me just answer yes.

Senator **Mikulski**. So for those who have participated in the competition, somewhere on or about July 1 they'll have an idea of how they turned out?

Secretary **Kemp**. I'm confident, Madam Chair, that we can fulfill that early date.

Senator **Mikulski**. Mayor Schroeder and I will know if there is going to be a project named after Jack Kemp in Baltimore.

Secretary **Kemp**. I don't want anybody from OMB to think that I'm not grateful for their willingness to help as well. A fresh wind is blowing throughout the administration.

Senator **Mikulski**. Well, obviously.

MODERATE REHABILITATION SCANDAL

Let's talk about another need for a fresh wind because there is an ill wind at HUD over the moderate rehabilitation program. I want to follow up on my questions; we've just been talking to the inspector general about the moderate rehabilitation scandal. I want to commend you for taking swift action to restore the credibility to the process of grant awards in this area.

Mr. Secretary, I have essentially three areas of questions. Let me give you the three that I would like you to go over, if you will.

First, what steps do you intend to take in the area of prevention?

Second, what steps do you anticipate taking to recover the overcharges estimated somewhere at possibly $400 million?

Third, how do you intend not to punish the good guy communities, the ones that were just going by the HUD regulations, they didn't hire consultants, they didn't hire shills, they didn't hire people dizzy from going through a revolving door and not punish those who really tried to participate in a good faith, good guy kind of way?

RESTORING INTEGRITY TO MODERATE REHABILITATION PROGRAM

Secretary **Kemp**. I think that's an important question—and I appreciate the use of the word integrity, because the integrity of the system is important for all of us, both here on the Hill as well as at HUD and throughout the administration.

The President asked all of us, and particularly those of us at HUD, to undertake an immediate review of those programs and policies that could be abused and this was one of—this was glaring. And integrity is important.

So the only thing that we felt that we could do to restore the integrity and to make the systemic changes in the moderate rehabilitation program that were so obviously necessary was to cancel the whole program.

I want to tell you, Madam Chairman, my goal, our goal at HUD is to get it reopened as quickly as possible. I'd like to announce today that my —I've asked my General Counsel to prepare for the Federal Register by June 1 the Notification of Fund Availability.

So I want to put that on the record, that by June 1, we will have published in the Federal Register that NOFA.

Senator **Mikulski**. What does that mean, Secretary Kemp, in plain English, that by June 1 you'll have a new set of rules or a new set of proposals or——

Secretary **Kemp**. It will be fund availability notification to all of the PHA's: We want to make it more equitable, we want more people to compete, we want to do this on merit, to the extent that that is humanly possible. We want to make sure that the good guys, as you put it, Madam Chair, are not squeezed out of the system by political influence.

I want to commend the inspector general. I don't know if—I didn't hear the hearings today, but as far as I can tell his report was thorough, it was sent over to Justice—which is I think the role of the inspector general that Congress envisioned.

When I saw that report, my staff and I at HUD cancelled that round; but we want to get it reopened and I wanted to announce today that by June 1, we will at least have this Notice of Fund Availability.

NEED FOR ONGOING AUDITS

I have asked the inspector general, Madam Chair, to have an ongoing audit. Those people who are going to participate in this program are going to know up front from day one that it is going to be audited very carefully.

Senator **Mikulski**. Can we come back to the June 1 funds availability?

There were some communities that had been approved—again, going by the rules, they're not subjects of the audit, they're not subject to scrutiny, they obviously stand in line with clean hands. Will they, on June 1, have to go back to square one as if it were a brand new proposal or will there be some type of recognition for the fact that they had already gone through a process, had been what I call clean hands on the project or——

REOPEN COMPETITION FOR CANCELED ROUND

Secretary **Kemp**. We wanted, as I said, to reopen it quickly. There is no prejudice against those PHA's or those projects. I don't think it's possible to put them ahead of the rest and still have it as competitive and as meritorious as we would like it to be.

I want it to be competitive. I think you would like to have HUD's process as competitive as possible, predicated upon merit, need, and cost-effectiveness.

CONTINUE EFFORTS TO RECOVER OVERCHARGES

We're going to pursue the audit to recover the overcharges. We want to reopen it quickly. There is no, as I said, prejudice against those who had participated.

But I must tell you that they can resubmit. So will they be advantaged against someone predicated upon merit, no, but will they be given—an advantage given to hard work and the quality of the project that might have given them an opportunity to get a program advanced earlier, the answer to that is yes.

So I think there's some subjectivity. But I'm trying to convey to you, Madam Chair, that they won't lose their position, they will be looked at very carefully. They've already done much of the work that's involved. But I don't want to say here today that——

Senator **Mikulski**. I'm not asking you to. I'm just trying to get a clarification of——

Secretary **Kemp**. Madam Chair, it will just be a broader competitive process, but they've done so much of the work that I think it would be advantageous to them.

Senator **Mikulski**. Thank you.

Senator Garn.

Senator **Garn**. Thank you, Madam Chair.

Mr. Secretary, I started asking some general questions and making some general comments to the inspector general that really went beyond his expertise or particular position and are more necessarily directed at you. I suppose, rather than asking you some questions, I would use this brief period of time to vent some of my frustrations and get some of your general feelings about your overall responsibilities as HUD Secretary.

FRUSTRATIONS WITH HUD'S COMPLEX REGULATIONS

It was some 21 years ago that I first started working with HUD with responsibilities as a city councilman in Salt Lake City before I became Mayor. I don't know what the outcome of this moderate rehabilitation will be, whether any laws have been violated, whether any criminal penalties—that's up to Justice to make that determination, not you or I or the inspector general to make those determinations.

I suppose what I'm driving at is the complexity of HUD and regulations in delivering housing that seem to breed this sort of thing, why people feel they need consultants.

Senator Mikulski and I were talking a few minutes ago and maybe I'm old fashioned but I thought the purpose of you being elected as a Congressman from New York, me being elected from Utah, and Maryland, was to represent our constituents.

I am sometimes actually baffled: When I heard just a few weeks ago a particular university at home ask me whether I thought they should continue to hire their lobbyists to work on a project that I had been working on for several years rather successfully as a member of the Appropriations Committee and I didn't know they had hired lobbyists and I never heard from them. So I don't know what they were being paid for, I thought I was doing my job as elected representative of Utah to handle constituent services.

So I have a hard time understanding all of the hordes of people that run around this town that I've never heard from who get paid enormous amounts of money to do something that I didn't even know they were doing. And I'm sure you've experienced that and Senator Mikulski has.

I suppose one of the reasons that, as I said, it breeds this complexity.

My frustration with HUD started when—a long time before the homeless problem was even heard of generally, when I was young and still had considerable amount more hair than I do now—that shows you how long ago it was—that we were trying to get some immediate emergency low-income housing. After 2 years of trying to figure out HUD regulations and trying to get HUD grants, I finally became so frustrated as Mayor of Salt Lake City I simply said, "Forget it, withdraw the application." I went to the Utah legislature and said if you'll provide $1 million, I will match it with local funds and got the whole $2 million and within 90 days we had some housing built, after 2 years of trying to even come up with a grant of any kind.

I won't take any more time going into those 7 years of frustration of working with HUD and with watching enormous amounts of money being appropriated by Congress and yet, as a local official, a Mayor, trying to figure out how you deliver that.

So maybe that is a system that breeds people saying we can't handle this, we can't figure it out, we can't deal with bureaucrats so we've got to hire a consultant. So that's what I'm driving at. I know it's an awfully big order and a big question.

I think your challenge and ours is much broader, as I said to the inspector general: How do we restructure HUD so that we are, in fact, delivering housing rather than massive amounts of rules and regulations that none of us can interpret or take years in the making and people are out on the streets?

SALT LAKE CITY—EXAMPLE OF HUD COMPLEXITY

So it's probably unfair to dump the whole world on you but, in general, after 21 years, is there some hope you can give me that we can possibly simplify the delivery of housing services and actually take care of the people we were intended to rather than the vast bureaucracy? Let me give you one example, one example that I will never forget when we were trying to build low-income housing in Salt Lake City more than 18 years ago.

They said, which made ultimate good sense, that we don't want to build concentrations of low-income, we want dispersal throughout the community. I said, "Oh, I agree with that, that's terrific." So we moved to a different area of town, but the land values were much more expensive so it becomes difficult to build low-income housing because the land costs so much more. So, obviously if you're going to do that you're going to have to have concentration of units.

HUD came out with a regulation that said you cannot have more than 15 bedrooms per acre—not units, not more than 15 bedrooms per acre. Well there were high-rise, high-income apartment houses in Salt Lake, 20 stories high, I don't know how many dozens of bedrooms they had per acre— $500,000 condos. And that was all right, but for low-income we're told you couldn't have more than 15 bedrooms per acre.

Well, obviously, you couldn't build low-income housing if you had those kind of restrictions. Almost 2½ years went by before we got that changed. Then the land values were so much higher and had increased, by the time we got that silly regulation changed, we had to move to a different site that wasn't as desirable because it was lower. Well that's just one of hundreds and hundreds of examples I could give you, so——

Secretary **Kemp**. First of all, Senator Garn, let me applaud the premise upon which your statement and your question is based. I think it is something with which both sides of the aisle would want to agree. I certainly agree with that.

PRESIDENT'S GOAL TO STREAMLINE AND REDUCE RED TAPE

One of the President's goals for his Administration is to streamline and cut through those bureaucratic regulations and the red tape.

There is a book out that—I'm not selling a book now but I certainly applaud the new book about Latin America, about the extent to which this problem can occur in some third-world countries, it's entitled, "The Other Path," by Hernando Desoto.

And it is sweeping Central America because he points out what has happened in Peru and a lot of other countries in Latin America, where regulations and red tape and the smothering of the government has killed the sector of the economy that we would call legal free enterprise, legal capitalism, or the legal economy and it has pushed developers and the poor into what they call the underground or the other path, el otro sendero.

It is a marvelous lesson, not only to Peru or to Latin America and to Mexico and other nations who are dealing with some of these third-world problems—it takes 24 months to get a permit to build housing legally in Peru, in Lima, but you can do it on the other path within days.

What's happened, poor people and the underground economy are building housing in Peru at a rate at which—of course, without the type of frustration that goes on in the otherwise legal economy.

Now what does that have to do with us? I think it's beginning in some instances to manifest itself in parts of our country. I noticed the other day in Louisville, KY, the median price of an affordable home—or the price of a home, the median price in Louisville, I think, was in the $70,000, maybe $80,000 range.

In Orange County, CA, where I and my wife bought our first home back in 1960 when I was a quarterback for the San Diego Chargers, cost us $15,000 for a four-bedroom home, $1,000 down, FHA mortgage, 5¾ percent fixed 30-year rate of interest, Wow. I didn't know what——

Senator **Garn**. I had a 5 percent.

STUDY ON BARRIERS TO AFFORDABLE HOUSING

Secretary **Kemp**. So I want to applaud your statement and I want you to know, Senator Garn, Senator Mikulski, distinguished members of this committee, for the record and in this room that I would like at HUD—on behalf of both sides of the aisle I would like to do a significant impact study as quickly as possible on all of the barriers in our country that have been introduced between people getting affordable housing: First-time home buyers, young people, the poor, and what is happening to their dream of homeownership and housing and shelter.

What we've tried to do in the moderate rehabilitation program is take out the influence which had grown, as you say, proportionate to the level of frustration and bureaucracy.

I don't mean to interfere with the hearings, but I just have in my hip pocket a chart that I was going to show yesterday, Madam Chair, but I would like to show it to the committee at this moment because it fits what Senator Garn is talking to.

And this did not come from—you and I have yet to talk about this issue, but I think it is important for the committee to see an example of what Senator Garn is talking about in Orange County, CA, one of the highest median priced housing markets in the United States.

[Secretary Kemp at the easel.]

The red boxes are county regulations, the blue are State, and the green is environment at the state and local level, notwithstanding what the Federal Government has. This little box down at the bottom that you cannot see, Madam Chair, is the house. But to get that house built, you have to start up here——

Senator **Mikulski**. Mr. Secretary, is that private sector housing?

Secretary **Kemp**. That's private sector housing. But it fits, I think, Senator Garn's point. And the cost is $40,000 from that top square down to build that little house at the bottom, which is shown in the little black there.

I don't do this to try to distract attention, but—what Senator Garn is attempting to show is what is happening in the United States. I would like to have a study done as quickly as possible with your support, Senator Garn, and with yours, Senator Mikulski, to look at objectively as possible all of the regulations, all the bureaucracy, all of the frustration, all of the barriers to affordable housing in America. Because you and I are getting hit on politically to make the Federal Government the sole repository for building housing in America.

It really is unfair because there's not enough money in the Federal Government to do all of the things that need to be done if

States and localities are pursuing policies that—while we're trying to build and be modern day Nehemiahs and then have Sanbalat and Tobiah and Geshem, if I remember my Hebrew scripture correctly, the three enemies of Nehemiah, out there throwing darts in our back and frustrating the process.

I was told by my staff yesterday the hearings were too boring, Madam Chair, so I needed to introduce——

Senator **Garn**. My time is up, Madam Chair, but if I could just conclude in all the years I have been here—and obviously Secretary Kemp and I have not talked, he certainly was prepared for my general question. [Laughter.]

Secretary **Kemp**. More than you wanted to know.

Senator **Garn**. No; I know all about that. I would only make two concluding statements.

NEED TO SIMPLIFY RULES AND REGULATIONS

First of all, you have made my point very, very adequately. I would only modify that that many of those local rules and regulations are required by the Federal Government, so most of the problem lies here in simplifying that process. I sometimes used to make the comment I was not the Mayor of Salt Lake City, I was the local manager for the Federal Government, getting my marching orders every day from region 8 headquarters in Denver of what I could do and what I could not do.

But you made the point very well: Not only does it delay housing for a considerable period of time, months or years, it greatly increases the cost of housing.

Secretary **Kemp**. Absolutely.

Senator **Garn**. I would submit that the HUD budget we're talking about is not adequate to meet the problem as the current regulations exist. If you can streamline and clean up the process, there is sufficient money to do the job.

CONGRESS, NOT CONSULTANTS, PERFORM CONSTITUTENT SERVICES

Second, I would just ask you if you would agree if it's old fashioned as a former Congressman for many, many years that there is not the necessity—and I realize I'm going to upset a lot of people and Internal Revenue, decrease the revenue from the income taxes they pay on these vast sums, but am I wrong in thinking that the Congress was elected to do constituent service work and for those who they are elected to represent and there is not the necessity for this vast array of people who reside here inside of the beltway being paid ridiculous sums of money when, in many cases, we're not even aware that they exist. They are billing people for services not rendered—because they certainly didn't ever come and talk to some of us who are the ones who have to vote.

Thank you, Madam Chair.

Senator **Mikulski**. I think those comments are well said and we're off to a quick start here. [Laughter.]

Well Jericho——

Senator **Fowler**. My name is not Jericho. I think you've got to be careful you don't go from Nehemiah to Joshua, because it is Joshua, Madam Chairman, that fought the battle of Jericho.

MAY NEED UNIFORM FEDERAL HOUSING REGULATIONS

But if you do a study you may end up, under the law of unintended consequences—not picking a fight, but just an observation on the Senator from Utah and on you, Secretary, that a lot of those—you may end up with a conclusion that you need uniform Federal regulations.

If you had in water and plumbing and—almost anything having to do with construction, one of the problems, as another city council president and local official for many years, as you know is you get—every local community and State have their own. And that complicates the procedure.

And if we had standardized—no matter who had them, whether it was local, State, or the Federal, if they all had the same thing, you could probably cut that by two-thirds.

I applaud you on the——

Secretary **Kemp**. Could I just respond very quickly? Because that's a very interesting point.

I want it known for the record that I don't suggest for a moment that we want to do to the country what Orange County in California has done to the housing market in that area. I don't favor removing the local process.

LOCAL POLICIES SHOULD MEET LOCAL NEEDS

I agree with Senator Garn in one aspect, but I would take it a step further and say to my friend from Georgia, that I think this country is responsible at the local level for designing policies in the main which meet local needs.

I don't want the Federal Government to overrule the city of Seattle, who decides that they want a no growth referendum, frankly that's their business, but I think it's important that you and I point out that if they pass a no growth referendum, that's going to lead to urban sprawl because the developer and the people that need the housing who are now without housing are going to move further and further out into the hinterland.

I was in Atlanta, the gentleman's home State, and went through downtown Atlanta with Mayor Andy Young and he showed me what he's doing to try to cut through some of the frustrating levels of regulation and tax policy——

Senator **Fowler**. We're on your side, now.

Secretary **Kemp**. I know that.

Senator **Fowler**. We'd love to see——

Secretary **Kemp**. We do want to preserve the right of mayors and city councils and States to do those things, but also need to know that some things are just plain an impediment to building affordable housing both at the Federal and the local level.

Senator **Garn**. Would the Senator yield for just a comment on building codes?

I don't disagree with what you've said so you're certainly not picking any fight, but what I think you have to look at in this maze is performance standards. When you get into absolutes and you have building codes that say you must have 3 inches of this type of material or use this kind of pipe, if you establish performance standards, like an R rating where it says you've got to have

R-27 or whatever it is but how you do it we don't really care, but you must meet that.

So I think there's a way for compromise: You can have uniform performance standards without getting into the specificity.

Senator **Fowler**. I thank the Senator.

Mr. Secretary, it goes without saying that we all applaud your vitality and I say with this long-term colleague and also the bipartisan consensus that we see emerging on behalf of trying to do a better job on housing, which I give your leadership and enthusiasm high marks——

Secretary **Kemp**. Thank you.

Senator **Fowler**. We always see the cooperation between Senator Cranston and Senator D'Amato on his bill, Senators Danforth and Mitchell, and I wanted to use my short time here to ask you your views on using the Tax Code to encourage low-income housing?

USE OF TAX CODES FOR LOW-INCOME HOUSING

Secretary **Kemp**. Senator, I said yesterday in my hearings that I have long been a supporter of using the Tax Code for socially-desirable goals and I consider affordable housing and homeownership to be two of the most important social goals for our country.

I'm very proud of the role that very many of us played in 1986 in bringing about tax reform, but when it comes to affordable housing for low-income people in America, it could very well be that we're going to need to take the best elements of the Rouse and Maxwell report as well as the Danforth-Mitchell or Mitchell-Danforth report and put into the low-income tax credit area the type of a reform that can both broaden and deepen the opportunity to incentivize our Tax Code to help those low-income people in the area of single- and multi-family dwellings.

Senator **Fowler**. I appreciate that, Mr. Secretary. And in that regard, just to extend it, something that I hope you will look at and look into—you probably already have—but I'm pleased that you are traveling throughout the country, the time you spent in Atlanta, I know of your determination to try and design the kind of housing programs that will revitalize our inner cities.

But as a representative of a State where there are two Georgias, where you have the huge economic miracle of expansion that is Atlanta, but where you have huge rural areas, I do want to point out to you—and I believe you will agree with me—as you design these, we work together in designing these things, that a low-income tax credit has a very strong impact in a rural area, in providing housing in rural areas. Whereas a voucher system would not, because there is no existing housing stock for people to take advantage of.

And as you—what you don't see I think is that what is appropriate sauce for the goose is not for the gander when you look at the different needs of—and they are huge needs—for affordable housing in the rural areas throughout our country. There are going to have to be different approaches, in my opinion, than what you need for the cities.

Secretary **Kemp**. I think as a general proposition the statement you make is quite defensible and quite logical and I would not disagree with it except to say I think you need both.

ADMINISTRATION FAVORS HOUSING VOUCHERS

Senator **Fowler**. We have housing problems, that they need housing. But again I'm coming in the back door and you can tell where I'm coming from. In this administration, just like the last administration, they're in love with vouchers. Vouchers do not do any good unless you've got existing housing stock.

Secretary **Kemp**. Could I just—let me just say what I said——

Senator **Fowler**. You do not have that blanket——

Secretary **Kemp**. I want you to know what I said to Senator Mikulski.

Senator **Fowler**. Please.

Secretary **Kemp**. I said that I don't want to be and I didn't take the job at HUD to be secretary of vouchers. They are a tool. And where we can empower tenants to become consumers or we can help put purchasing power and choice into the hands of poor folks in this country, near-poor, at that margin of life where it is so important for them to get dignity, I favor a voucher as one element, one tool of this process.

But as far as construction goes, I would like to see the Tax Code be utilized as a way of incentivizing the building of affordable housing for low-income people in the area of single- and multi-family dwellings.

I think you and I have to take a hard look—and I want—the President has not told me that he is in love with vouchers—we like vouchers because of what it does as a tool but he has told me that he is strongly supportive of this whole idea of affordable housing opportunities—quote, unquote—and I want to work with all of the tools and all of the resources of the Federal Government and the Tax Code and the thrifts and the nonprofits to bring about this great goal that you and I share.

Senator **Fowler**. Thank you.

Have I got a little more time?

Senator **Mikulski**. You certainly do.

HOUSING FOR THE ELDERLY

Senator **Fowler**. Just one more question, Mr. Secretary, and I have some I will submit for the record. But I don't want to go over any ground that you went over yesterday and I apologize to you and to all that I was not here—I understand that our Chair spoke—you had discussion yesterday about the difficulty of reviving housing programs and our budgetary restraints and our cuts in the past and you may have got into the question of elderly housing. But if you didn't, I would just like to ask that question.

It seems to me the market reflects that housing for the elderly has been probably most affected by cutbacks in housing and reduction. At the same time, for obvious demographic reasons, we are probably facing that as our greatest potential need.

So, as you get to the right page on the figures there, I would like to ask you just your overall—what you and the agency see as the projected need for federally assisted affordable housing for the elderly and what would be your priorities in addressing the housing needs facing the elderly in our country.

Secretary **Kemp**. First of all, I think there has been an impact; I don't know that the impact has been quite as deleterious in this area. But we're not arguing that point for the moment, I do agree.

When I was in Philadelphia, Senator, right after my trip to Atlanta, I stayed in a 202 senior citizen housing—I hate to call them projects—community or neighborhood or however we refer to them, run by Dr. Leon Sullivan and the Opportunities Industrialization Centers of America. I am a great fan of his. It was a paradigm for many other communities.

I support construction in this area of 202 senior citizen housing as well as for the handicapped and I want you to know that I am committed to emulating some of the very outstanding work that is being done and I saw one of them, Barbara, in Baltimore for low-income elderly inner-city residents.

I know it's popular with you; I want you to know it's equally popular and necessary with us.

NEED FOR INCREASED ELDERLY HOUSING

Senator **Fowler**. I mention simply the demographics are overwhelming us: We've just got people living longer.

Secretary **Kemp**. What?

Senator **Fowler**. The demographics are overwhelming us: People are living longer and we've got more of them; we've got more old people, we've got more poor old people. We've got more poor old people; we need more housing. And we are all in the business of trying to find the most creative ways to do it and to do it differently and find a way for the private sector to help us in initiating new ways than we might have thought of to get more built.

But we're falling behind. Without pointing fingers at anybody, those communities you go to will tell us how desperately they need more housing, federally assisted housing for the elderly. We've got to have a program.

I do think this committee—I won't speak for our fine Chair, but we've been working together for many years and I do believe that it ought to be a priority not only for our Government but for our Nation.

Secretary **Kemp**. I'd like to work with you to find the type of funding mechanism, financing, that—there has been talk of credit vouchers but essentially we can pay up-front points to substitute private lending for the direct Federal loan.

I'm interested in the result and I'm looking for the means to achieve those results and I'll be glad to work with the Congress in this area, because I share the gentleman from Georgia's concern about this very important need in our country.

Senator **Fowler**. I thank the Secretary and look forward enthusiastically to working with him.

Thank you very much.

Secretary **Kemp**. Thank you.

Senator **Mikulski**. We'd now like to recognize our colleague, Senator Brock Adams, who chairs the Subcommittee on District Appropriations and who has been most active and aggressive in terms of the antidrug campaign in the District of Columbia. We welcome you, Senator Adams, for the line of questioning you wish to pursue.

ILLEGAL DRUG ACTIVITY IN PUBLIC HOUSING

Senator **Adams**. Thank you very much, Chairman Mikulski. Mr. Secretary, it's a pleasure to see you again. I know you've been here the day before, but I want to discuss what is going on in the District of Columbia, which is the illegal drug activity on public housing grounds. I also want to relate this to our situation in Seattle, WA.

Secretary **Kemp**. Right.

Senator **Adams**. I want to emphasize, first, Mr. Secretary, that I just toured Seattle with the police chief, the community block grant organizations, and public housing. Public housing is not the only place where illegal drug activity is going on, and I want to be sure that everybody understands that, that they represent just a part of the problem. But I've toured through my old neighborhoods in Seattle and I can say that some of them are very much in trouble.

But, first, I wanted to focus on public housing with you because you've had a very good task force, the HUD task force on antidrug efforts, which was put together with the National Association of Housing and Redevelopment officials. We have in Seattle a particularly good person, Mr. Harry Thomas, Executive Director of the Seattle Housing Authority, who was an active member on this task force.

I might say that when I was a young person I represented the Seattle Housing Authority, so public housing in my neighborhood is not a strange animal to me.

Now one of the things that I need to know, because we're going to have to do something in the District as well as other cities—and each city has its differences, is a description of innovative strategies that have been promoted.

Mr. Thomas has worked together with the local police department. I have talked with the police chief, with the legal service providers, and the community block organization people—they run all the way from the Salvation Army to the YWCA and so on—about ways to enforce the lease provisions and prohibit trespassing on public housing without violating due process.

Now, I am not one who feels that this is an easy problem. I wouldn't be here to question you about it if it was.

HUD ANTIDRUG TASK FORCE RECOMMENDATIONS

Now, I'm going to quote from the task force and I'd like to ask you what you think about this. The task force suggested that there be special coordinated initiatives between the local law enforcement—in other words, the police, the social programs, which are the social providers, both private and public, and the public housing authorities. This includes providing tenant job training on the project grounds itself, also day care on the grounds for the mothers that have to leave as well as family counseling.

Secretary **Kemp**. Right.

Senator **Adams**. Now, has HUD determined what would be needed to accomplish all of this? Do you have any cost levels for us? Can this program be coordinated with the other Federal agencies so that we get this right on the projects themselves?

I'm going to talk about the police in a minute, but I wanted to approach from that end first, if we could.

Secretary **Kemp**. Well, my response to your question is an enthusiastic yes, we've worked with the National Association of Housing and Redevelopment Officials, their task force and their report has been in our hands. We've used it in part as a premise, along with PHA reports from about—how many did we get, how many responses—1,500 or 1,600 PHA's around the country sent in their recommendations and we've used that as the basis of our recommendations in the 10 point proposals that I outlined yesterday and for the record we did with Mr. Bennett and Attorney General Thornburgh 4 weeks ago.

So, as far as the actual suggestion about coordinating the police, the PHA, and the tenants themselves, again I strongly subscribe to what you're talking about and as far as day care and job training of the residents in public housing, what an outstanding idea.

Senator, as you may know from reading the local newspapers, this is the type of thing that was used at Kenilworth Park right here in public housing in the District of Columbia to not only get rid of the drug dealers but to build up the quality of life at Kenilworth and it has my complete, complete enthusiastic support as well as my willingness to use Federal funds where necessary to accomplish those purposes.

Senator **Adams**. That's all good to hear. Mr. Secretary, I would like my staff to work with you on these matters.

Secretary **Kemp**. OK.

Senator **Adams**. Right now what HUD is doing is robbing your operating funds and development money in order to carry out these antidrug programs. What I'm saying is that it is critical to get our streets back, but also to retain HUD operating and rehabilitation funds. I would like my staff to work with you on that.

SECURITY IN PUBLIC HOUSING PROJECTS

Now, I've got a second question and another proposal.

Security in these areas is generally a critical component to the equation. In fact, that's why on the District of Columbia Subcommittee I am supporting the use of the Capital Police force to assist in the antidrug problem, as well as the uniformed Secret Service. I will be making a proposal in the Appropriations Subcommittee that money be reprogrammed within the District to pay overtime to the officers. We have to stabilize the situation by having officers on the spot.

But now here's the problem—I'd like to have you think on it and answer later, not necessarily now.

We have a problem in Seattle, for example, a single mother living in a unit who is a good person and has two or three children. The 17-year old starts to deal drugs, in the family, or a new friend, male or otherwise, moves in and deals. Do we have a program where the whole family isn't put on the street because of one person. Otherwise, we've got a homeless family.

This is very difficult. And what it requires—which is why I mentioned it first—is very close communication between the management of the projects and the police department as well as the social agency.

Secretary KEMP. Right.

Senator ADAMS. Therefore I hope that we can solicit suggestions from your Department. I hope that you'll give them to Mr. Alan Osaki here. Also, that you can be helpful on the District Subcommittee here because we're taking on these housing project problems, one-by-one. And if we're going to board up part of them, we want to be sure we've done it correctly.

I wanted to ask your opinion on something else, though we are not ready to suggest it yet.

DEALING DRUGS SHOULD BE A FEDERAL OFFENSE

What about the recommendation of the task force that it be an enhanced Federal penalty to drug deal within 25 feet of a public housing project.

Now we've got one for within 1,000 feet of a school or playground. I want you to think about the ramifications of this suggestion.

Secretary KEMP. All right.

Senator ADAMS. I happen to feel that suggestion is one of many necessary parts to help us solve the problems in public housing. God only knows the residents suffer enough under a multitude of problems. We don't want to pass some blunt instruments that don't work. So we will be relying a great deal upon your suggestions.

But I want to say this to you, Mr. Secretary: If we don't get the right suggestions, this Congress is going to pass some very blunt instrument laws. And I don't want to see that happen. So whatever suggestions you may have or response you want to make to that, I would appreciate it.

Secretary KEMP. Well, off the top of my head, I would say, first of all, we would like to work with you and your staff and Senator Mikulski, Chairman Mikulski on this, and both sides of the aisle. I think Congress, under the 1988 Drug Act, requires leases to allow evictions on or near premises for people engaged in that type of activity that you alluded to. So the answer is that we would like to work with you.

DRUG-FREE PUBLIC HOUSING—A GOAL

I've been wrestling with this problem and I think it has to be done on a case-by-case basis. As I said yesterday in response to Chairman Mikulski's comments that I wanted HUD to be tough on drugs in public housing. We want to make public housing, as a goal, drug-free. We want to make it drug-free; we want to be tough for due process. And then I also want to be tough in favor of parental and family responsibility for what goes on in the unit of public housing.

And there we need the wisdom of Solomon almost to figure out what mother might know or condone—and it's hard for me to say this, hard for me to say it, to think it: There are some people in our society in which the use and abuse and trafficking and encouragement of drugs is going on and, believe it or not, in a family, from mom and dad right down into the cousins, as in the Edmonds family here in the District of Columbia.

On the other hand, what do you do with a grandmother who is trying her level best or a mother trying her level best to raise a family decently and honorably?

And, as you pointed out, most of those public housing residents are the strongest supporters of an effort that we are trying—it's agonizingly slow in all too many cases—to try to deal with in public housing.

So on a case-by-case basis all I can say is I believe the PHA's are trying as never before, I want to encourage that, and we've got to look at it on a case-by-case basis, but we've also got to remind ourselves that families do have—parents do have a responsibility, not the sole responsibility, but a responsibility to know what's going on in their family, what's going on with their children.

Because if you heard the testimony given by the women who came before Senator Nunn's subcommittee the other day, one mother was quoted in The Washington Post as saying that she found out her son, 18, 19 years old, was into drugs and she said I want him out, I don't want him in this unit, I don't want him jeopardizing the rest of our access to public housing.

So we're pleased to work with you, I think we want to and I think we've got people throughout HUD who are sensitive to that vexing question that you have raised.

Senator ADAMS. Thank you very much, Mr. Secretary.

Madam Chairman, I wonder if this article might be put in the record? It is an outline of how we have done some things in my State.

I also want just to close by saying thank you very much, Chairman Mikulski, for allowing me to be here.

There is also a terrible fear factor in our area. We have the Crips and the Blood gangs up out of Los Angeles and they terrorize many neighborhood areas once they have moved in. I think we have to move in on the public housing project problems, in a fair and reasonable way.

Secretary KEMP. Thank you.

Senator ADAMS. Thank you, Madam Chairman.

PUBLIC HOUSING—A ROAD TO A BETTER LIFE

Senator MIKULSKI. Second, a couple of things: No. 1, we'll be working with Secretary Kemp on the issue of drugs in public housing, one, from an enforcement perspective, recognizing due process—and Secretary Kemp is fortunate in having tapped former Assistant Secretary Keating of the Department of the Treasury who, in my mind, is one of America's top cops, as he oversaw the Bureau of Alcohol, Tobacco, and Firearms and some others over at Treasury, and who brings to the General Counsel's Office I think that perspective. And if anybody knows Miranda rights and so on it's Mr. Keating, but at the same time he has an intimate knowledge of what these issues are.

The other areas that we've talked about is that public housing was never meant to be a way of life, it was always meant to be a cushion on the road to a better life.

We also have been talking about how we can bring capacity building to tenants within public housing to move them either to management or ownership and also to talk about programmatic factors that Congressman Stokes is calling gateway: Those extra self-help things that can move people to develop their very personal capacities.

We're talking about making public housing, first of all, fit for habitation, modernizing it; second, capacity building for tenants to be able to have a stake in the issue; and then also the gateway to a better life and while they're doing that that they feel pretty darn safe and secure and getting the drug dealers out of there.

Senator **Adams**. Madam Chair, I just am very pleased that you are the Chair of this committee, I'm very pleased.

I think, Mr. Secretary, that you have a great ally.

Secretary **Kemp**. I'm thrilled by Senator Mikulski's comments, not just today but in my visits with her to Baltimore and I want to thank you for your questions.

MOST PUBLIC HOUSING ARRESTS ARE TRESPASSERS

I would just remind everybody: In San Francisco public housing, 85 percent of all of the arrests were of nonresidents who had been trespassing. So your idea about the trespass law, careful to due process, of course, as you pointed out—we've got to do something. If it takes a law that says dealing in drugs within 25 or 30 or 40 feet, I would like to look at that, and have this administration work with the Congress in coming up with some protection for public housing that we have given to our children in public schools and that ought also to be given to those decent and honorable people who are living in public housing throughout our country.

Senator **Adams**. Thank you, Mr. Secretary.

Thank you, Madam Chair, very much.

Senator **Mikulski**. OK.

Mr. Kemp, we're going to adjourn about 11:50 a.m. or 11:55 a.m. because the respective party caucuses are meeting. Let me come back again to the moderate rehabilitation program for a few minutes and then I'm going to go into some issues of generating supply of housing.

PLANS TO RECOVER MODERATE REHABILITATION OVERCHARGES

It is estimated that there is about $400 million in the so-called overcharges pending in the moderate rehabilitation program. Do you have any plans or techniques on how you're going to be able to recover that $400 million? It would go a long way on a bare bones budget if we could recover that or recapture that.

Secretary **Kemp**. I would like to suggest that this audit that has taken place and will continue to take place, we want to recapture and recover those moneys that HUD has been paying in excess of a legitimate cost.

And I'm going to ask Jim Schoenberger to come forward and help edify the committee with regard to a more specific response to your question, Madam Chair.

Mr. **Schoenberger**. Senator, the $400 million number is a projected number that the inspector general estimated of future cost of excess subsidy payments over a period of several years. As part of what we're doing in moderate rehabilitation, we are going to be sending audit teams over 300 PHA's looking basically at selections that have been made since 1985 and subsequent years, and where we find that the rent levels have been set too high because of the inappropriate level of rehabilitation and that sort of thing, we will, on a case-by-case basis, take steps to roll back the rents, and that will in turn save subsidy costs over a multiple-year period.

I should point out, however, that this is not as simple as it might appear because some of those projects have either insured or coinsured mortgages supporting them and when the rents are rolled back you put the mortgage in jeopardy in terms of a default. So we'll have to do this on a case-by-case basis, recovering the money as best we can and we are hopeful that we can recover a substantial portion of the excess funding.

Senator **Mikulski**. What do you think would be the timing on that and do you have any estimates of the amount that you'll be able to recapture?

Mr. **Schoenberger**. Well, we don't really have a good estimate of the amount we'll recover until we do the audits, but we would attempt to get all of the audits done within the next 12 months.

Senator **Mikulski**. Well it would be very important to do that because we think it would be important, for example, if there is say $50 million in actual overcharges, that would go for that earmarked in CDBG that we like to talk about.

HUD'S EFFORT TO IMPROVE PUBLIC IMAGE

Let me move back to prevention: Inspector general discovered scandal in moderate rehabilitation. Right now there is a great deal of perception that previously there were ethical lapses at HUD. My question to you, Mr. Secretary, is what do you see in the way of prevention in turning this attitude around?

We've had the moderate rehabilitation problem: A former Deputy Assistant Secretary who was indicted last week by a Federal Grand Jury in Mississippi for improperly using his influence while at HUD in the mid-eighties to obtain an economic development grant.

When I became Chair in January some former employees returned at least 33 percent of the remaining funds in the 312 program for a sweetheart deal in Puerto Rico which Bob Traxler then stopped.

I'm just wondering where we're heading with this.

Secretary **Kemp**. Madam Chair, let me say that I took this job with an eye on those standards that I know the Congress, as well as President Bush, might uphold and throughout his administration. I think your leadership on this issue of ethics and removing the systemic problems means that—first of all, getting the right people.

May I say, Madam Chair, that I am thrilled, honored, pleased by the quality of people who we have chosen to come into HUD. I'm very pleased, Madam Chair, to report to you that there has been a response among men and women in this country, among all groups that are interested in coming into HUD; we think we have chosen some outstanding people. So given the right men, the right women, the right people, the right standard is absolutely essential.

Thomas Jefferson said: "Put not your trust in people but bind them down from mischief with the chains of the Constitution." I think he was saying that we also need law, we also need regulations and auditing and monitoring and I want to applaud the efforts that our inspector general has made to bring this to our attention and your action in Puerto Rico and my willingness to respond quickly. I think there is a fresher approach.

HUD ASSEMBLES A HIGH-QUALITY TEAM

But that isn't enough. We need ongoing reform and I pledge to you that we're going to have not only men and women throughout HUD, both at the career and those who have been appointed, who adhere to those high standards but we want to find ways of reforming the system and making those systemic changes that I think you would like to see at HUD. So wherever we can make them we will and it's an ongoing battle.

But I hope that the moderate rehabilitation program changes and efforts will send a signal vertically into every nook and cranny of HUD that this Secretary and his team want HUD to be open not only for business to the extent that we want to be but also open for a competitive, meritorious, cost-effective approach to helping poor people and helping these great goals that I think most of us share for the future of this country.

Senator **Mikulski**. Well, I know you've attracted some people, particularly Mr. Delabovie, who is your undersecretary that we know from UMPTA and some other programs, certainly Mr. Keating we are very familiar with from our work on Appropriations and we hope to get to know better. But we do know that good management can go a long way.

And like you, I think, to cheat the poor has got to be one of the worst forms of skullduggery. All kinds—all abuse is wrong. But there is an article in The Baltimore Sun that says that 11,000 kids are homeless. And I could go on.

INSPECTOR GENERAL CITES IMPROPER MANAGEMENT PRACTICES

But in the inspector general report one of the things that the inspector general identified was some management practices. For example, it talks about the lack of commitment on management's part to provide attention to those areas needing it most: Program regulations were not revised to keep pace with program policy and actual program practice; key books, directives, and other written guidance was a patchwork collection of unrelated and unclear instructions. And it goes on and on and on.

Essentially the summary conclusion on page 5 is all these factors tended to confuse or blur the lines of authority and no lines of accountability. We know that as you provide the vision, the energy, the inspiration, the ideas that we hope, it's going to be good management making use of, I think, very skimpy resources that we'll be able to do this.

So, we look forward to hearing that and from the Assistant Secretary of Housing as he goes through this process of recovery. We would like to keep updated on this, but we're mindful and hopeful of bringing some other funds in.

Mr. Secretary, I have many other questions that I'm going to submit for the record——

Secretary **Kemp**. For the record, may I just introduce into my testimony in response to your very thoughtful comments, Madam Chair, my letter to the House Committee doing the investigation. I apologize, I would like to also have for your edification all of the things that we have done and what I've asked my general counsel to do at HUD and what we've asked the inspector general to continue to do at HUD on these very important programs. So, I think it would be edifying not only to you but to all the committee if we could submit this for the record.

[The information follows:]

SUMMARY OF MAJOR REFORMS
UNDER JACK KEMP

Part I

1. SECTION 8 MODERATE REHABILITATION

Program Description

Focus. Designed to provide rental housing for low-income families, the Moderate Rehabilitation program is a component of Section 8 of the U.S. Housing Act of 1937. With Section 8's New Construction and Substantial Rehabilitation programs phased out by the mid-1980s, Mod Rehab remained the only project-specific, deep-subsidy program available to developers. Once targeted to light rehabilitation (as little as $1,000/unit in smaller, 10-20 unit projects) the program evolved into one supporting the substantial rehabilitation of much larger projects.

Nature of Subsidy. Owners make repairs and then are reimbursed by HUD over the subsequent 15 years in monthly housing assistance payments. In return, owners rent the units to low-income families who pay up to 30% of their income as rent. HUD allows overall rent levels such that its contributions plus the tenants' contributions are sufficient to cover the costs of the project and the repairs and provide a 10 percent profit.

Method of Selection. Under HUD regulations (24 CFR 882.501), HUD invites local Public Housing Authorities (PHAs) to compete for such funds. The PHAs submit applications to HUD Field Offices, which grade them on technical criteria. Funds are allocated to the field by "fair-share" formula which targets funds to areas according to population, need, etc. A certain portion of the funds (up to 15% of overall Section 8) can be allocated on a discretionary basis by the Secretary. After being notified that they have received funds, the PHAs hold public competitions for owners to apply for subsidies.

Problem(s)

"Influence Peddling." The fair-share allocation process described above was waived by Congress in 1984. Fund awards from 1984 to 1988 were 100% Headquarters discretionary. While such discretion in limited quantities is valuable (to meet emergencies, settle litigation, undertake innovative programs, etc.) a lack of public accountability and documentation led to a selection process which gave the appearance that specific projects and developers in many cases were "pre-selected" in Headquarters. This appearance, coupled with numerous allegations that "access" consultants were involved, portrayed the process as fixed.

Although the 1989 funding round was 85% fair-shared to the regions and documented, the old process was sufficiently institutionalized that even those selections were suspect.

Improper Rent Calculations. Under Section 8, HUD will allow a project's rents, paid jointly by HUD and the tenant, to rise to the Fair Market Rent (FMR) audit. For Mod Rehab projects, the rents can be increased up to 144% of FMR to cover exceptional rehabilitation costs. A HUD audit determined that in many cases these costs were inflated, leading to excess HUD rent payments.

Actions Taken

April 7, 1989	o Notified HUD field staff of Inspector General's audit findings and affirmed policy of zero tolerance for program mismanagement or abuse. (See Appendix A)
April 26, 1989	o Ordered cancellation of FY 1989 fund awards which had not yet been committed to PHAs (30 projects). Recovered $262 million of Budget authority for reallocation. (See Appendix B)
	o Directed Office of Housing at HUD to develop new, competitive selection procedures.
	o Directed Office of General Counsel at HUD to review existing ethics and personnel conduct laws and regulations.
	o Ordered review of rent calculations for all outstanding Mod Rehab projects awarded since 1984; announced intention to pursue contract adjustments and recovery of all overpayments.
May 5, 1989	o Imposed tighter control of rent structure for coinsured mod rehab proposals. (See Appendix G)
June 2, 1989	o Announced reopening of Mod Rehab program under new rules designed to ensure eligibility for all PHAs with severe needs, based on set formula, "fair-sharing," and limited number of units per project. (See Appendix C)
June 9, 1989	o Notified public that $262 million of funds recovered from earlier FY 1989 process was available in new, competitive round under new regulations. (Funding was reduced to $220 through enactment of the Dire Emergency Supplemental Appropriations Act of 1989.) (See Appendix D)

In addition to these actions, Secretary Kemp is pursuing other Mod Rehab reform initiatives, including means by which limits may be placed on the extent to which Mod Rehab is used with other Federal subsidies, such as the Low-Income Housing Tax Credit.

Secretary Kemp's Goal

To ensure that all HUD programs, including Section 8 Mod Rehab, follow statutory and regulatory guidelines, and that awards are granted through fair and open competition on the basis of merit and need.

2. COINSURANCE LENDING PROGRAMS

Program Description

Risk Sharing Philosophy. Traditionally, HUD has made its FHA insurance underwriting decisions itself. But the high cost of maintaining a nationwide field staff of appraisers, architects, and underwriters, as well as the frustrations of industry with slow processing and paperwork, led to a major effort in the early 1980s to delegate these functions to private industry. To ensure conservative underwriting standards on these delegated underwriters, HUD requires that they pay the first 5% of any claims, and split 15% of any remaining losses with HUD. Thus, they are termed "Coinsuring Lenders." They obtain the funds to lend through issuing securities backed by GNMA, another HUD agency.

Program Delegated. Coinsurers are permitted to commit HUD to the insurance of multifamily rental projects: construction (Section 221(d)) and rehabilitation and refinancing (Section 223(f)). In 1988, Coinsuring lenders were permitted to underwrite nursing homes under Section 232, although only two such projects have yet been insured.

Problem(s)

Poor Underwriting/Excessive Default Rates. Capital requirements did not keep pace with dramatic increases in lenders' loan portfolio. This became disastrously apparent when markets in the Southwest began to collapse. With a surge of defaults, the risk-sharing formula became an meaningless. To further exacerbate the problem, some lenders, having little or no residual capital at risk, were tempted to increase volume to earn the origination fees (up to 3.5% of the loan amount). Eventually, HUD became the 100% insurer as a portfolio of seriously troubled loans (see DRG).

Overmortgaged Properties. Many properties were insured for more than they were worth. The most famous example to date was the Colonial House Project in Houston. Mortgaged and insured for approximately $46 million, it was foreclosed and sold at auction in May 1989 for approximately $9 million. Developers apparently would "shop" for the highest appraisal among the coinsurers, and the coinsurers had an interest in higher loan amounts as their fees were based on a percentage of the mortgage.

DRG Funding Corporation. The second largest coinsuring lender in the program was DRG Funding Corporation, with $1.8 billion in loans written. The underwriting practices of DRG had raised concerns as early as the middle of 1984. HUD monitoring was ineffective and enforcement not adequate as DRG's defaulted properties numbered more than 100 by late 1988. DRG subsequently was declared in default and was terminated from the GNMA mortgage backed securities program amid an FBI investigation of fraud, theft, and embezzlement.

Ineffective oversight past monitoring activities by HUD as well as periodic Inspector General and GAO audits, identified severe problems with DRG's performance as a coinsurer. Current monitoring activities with enhanced reviews of underwriting as well as our new pre-default project monitoring will provide an even better early warning system.

A partial list of DRG problems identified by past monitoring is as follows:

1. Underwriting and other problems led to placement of DRG on probation as early as November, 1984.
2. Improper closing of loans before completion of repairs (November, 1985).
3. Inadequate net worth (June, 1986).
4. Unsatisfactory underwriting and inadequate management oversight (March, 1987).
5. High level of defaults (July 1987). Limited preconstruction review imposed (August, 1987).
6. Inspector General recommended suspension of DRG for above problems (January, 1988).
7. GNMA terminated DRG as a GNMA issuer-servicer for failure to pass through debt service payments (September 1988).
8. HUD Mortgagee Review Board disbars DRG (March, 1989).

Actions Taken

March 22, 1989	o	Ordered suspension of DRG Funding Corporation from coinsurance program. (See Appendix E)
April 25, 1989	o	Ordered suspension of Puller Mortgage Corporation from coinsurance Program. (See Appendix F)
May 5, 1989	o	Ordered moratorium on the acceptance of new coinsuring lenders into the program pending a 120-day review and reform of all coinsurance procedures. (See Appendix G)
	o	Placed three coinsuring lenders on probation, requiring HUD pre-approval of all commitments.
	o	Placed three additional coinsuring lenders on "special watch."
June 6, 1989	o	Commenced discussions with coinsurance industry in exhaustive process of developing program changes.
	o	Hired Price Waterhouse to help develop an appropriate "risk-based capital" approach to net worth and operating loss requirements for coinsuring lenders.
June 29, 1989	o	Directed Office of Housing in HUD to develop computerized tracking of all new commitments.
July 5, 1989	o	Commenced study to determine adequate staffing and support within HUD to maintain adequate monitoring and enforcement.

Secretary Kemp's Goal

To improve the coinsurance program by means which minimize risk and maximize potential to produce affordable multi-family housing.

3. TITLE X LAND DEVELOPMENT MORTGAGE INSURANCE

Program Description

In 1965, FHA added a new product line: insurance against loss in lending to developers for land acquisition and development for residential communities. "Development" includes water and sewer lines, streets, lighting, etc. No low-income use is required; instead the statute merely expressed a desire that the communities be "mixed use."

Problem(s)

Excessive Losses. Out of 58 loans insured since 1977, 25 have gone into default -- a 43% claim rate. Net losses to date have been over $50 million, with eventual losses to reach an estimated $90 million. The insurance premiums collected are only 2% of the loan amount.

No Low-Income Housing Provision. Excessive losses were not mitigated by any social purpose. This was a developer-driven program.

Actions Taken

June 2, 1989	o Requested that the Inspector General review potential abuse in the selection process underwriting criteria in the Title X program.
June 29, 1989	o Announced intention to terminate program and imposed a moratorium on the issuance of new commitments. (See Appendix H)
	o Directed Department to proceed with termination rulemaking.

Secretary Kemp's Goal

To end a program which costs millions to taxpayers, is being adequately handled by the private sector, provides little housing for low-income families and principally benefits developers and consultants.

4. RETIREMENT SERVICE CENTERS

Program Description

FHA insures mortgages on rental housing projects for the elderly who require certain support facilities, but not on-site medical care. These "retirement service centers" are thus for the relatively affluent and healthy elderly, and are distinct from nursing homes, board and care facilities and elderly residential facilities. The Retirement Service Center program is an insurance program authorized under Section 221 of the National Housing Act and regulations contained in 24 CFR Part 221 (full insurance) and Part 251 (coinsurance). It is not related to HUD's subsidy-backed Section 202 elderly housing program. Retirement Service Centers became an eligible program under coinsurance in 1986.

Since 1983, $583.2 million of Retirement Service Center debt has been approved by HUD itself (full insurance) and $626 million by coinsuring lenders.

Problem(s)

High and Growing Default Rate. Because services are provided, they fall outside of HUD's traditional "bricks and mortar" expertise. With little expertise in this new field at HUD and apparently little experience on the part of some sponsors, particularly with regard to the program's target market, it was inevitable that misguided and unneeded projects would be built. The default rate has reached 29% on full insurance loans (12% to date for coinsurance) and appears to be headed much higher with many projects now finishing construction and known to be experiencing trouble in renting up. Losses have totaled $119 million to date.

Low-Income Elderly Underserved. Retirement Service Centers are targeted to the relatively affluent elderly who can pay market rates for rental housing and daily services. When such a project defaults, the taxpayers end up subsidizing not the low-income elderly, but the high-income elderly instead.

Actions Taken

July 6, 1989	o Ordered suspension of insurance underwriting for Retirement Service Centers, pending analysis and reform of procedures. (See Appendix I)

Secretary Kemp's Goal

To determine whether the Retirement Service Center program can be redirected towards low-income elderly and expose FHA to a more reasonable risk.

PART II

5. CLOSING AGENTS -- CASH MANAGEMENT

Program Description

FHA insures loans on single family homes. If a mortgagor defaults, the lender forecloses and FHA acquires the property, then sells it through a competitive bid or auction.

Generally, FHA contracts with private agents to close these sales and disburse the proceeds to the U.S. Treasury by wire transfer. This wire transfer should be executed within 24 hours (or the next banking day) of closing. HUD headquarters shares responsibility with the local field offices to assure that all funds are received by the Department. The closing agent manages a non-interest-bearing account, for which HUD is a cosignator, to cover the costs of closing.

Problem(s)

A HUD review of the local Washington, D.C. office revealed that approximately $10 million in sales proceeds were unaccounted for. A subsequent joint investigation by HUD and the Inspector General uncovered an alleged scheme by a closing agent to defraud the government of $5.7 million in FHA sales proceeds. Dubbed "Robin HUD," the agent allegedly embezzled funds and distributed some of them directly or in the form of gifts to local residents.

In addition, the HUD Inspector General has completed an audit of eight field offices, the results of which show lax or inadequate procedures being followed. Additionally, several other closing agents around the country are currently under investigation.

Actions Taken

June 7, 1989	o Placed on administrative leave four D.C. area office employees responsible for sales program, pending further investigation. o Issued advisory to Regional Administrators and Field Office managers to impose strict accounting controls and management procedures, including requiring use of standardized contract closing agents, and that they would be held personally accountable for adherence to guidelines and procedures. (See Appendix J)

	o	Brought in Price Waterhouse and Grant Thornton accounting firms to review new central accounting system being implemented in property disposition.
June 8, 1989	o	Requested Inspector General to conduct audit of sales program in high-volume HUD offices nationwide. (See Appendix K)
June 23, 1989	o	Established Asset Recovery Strike Force under Frank Keating, General Counsel-designate, to recover cash and property embezzled or misapplied. (See Appendix L)
June 28, 1989	o	Requested Attorney General Thornburgh to devote special priority of all 94 U.S. Attorneys to investigate fraud and cash management in HUD field offices. (See Appendix M)
June 30, 1989	o	Initiated debarment proceedings against seven title company/closing agent firms. (See Appendix N)

Secretary Kemp's Goal

Institute proper accounting procedures for all programs and establish strict accountability for the control of HUD funds.

6. ACCOUNTING FRAUD -- DENVER

Program Description

HUD makes payments to private owners of low-income multifamily projects through the Section 8 program. Generally, payments are made via wire transfer from the U.S. Treasury to individual bank accounts maintained for the projects. Accounting divisions in HUD's ten regional offices authorize monthly payments.

Problem(s)

Alleged embezzlement of approximately $1 million in Section 8 rental subsidy funds by Douglas R. Turner, a HUD accountant, was recently uncovered by a co-worker in the HUD Denver Regional Officeduring a normal accounting review process.

Between November 1988 and May 1989, payments were made to two unauthorized companies, both owned by Turner. The funds were allegedly transferred via wire transfer from the U.S. Treasury to the accounts as payments to a phony Section 8 project. The Inspector General issued a subpoena for the bank records which showed Turner as the owner of the account.

Actions Taken

May 23, 1989	o Case was immediately referred by the Inspector General to the U.S. Attorney in Denver for criminal prosecution.
June 5, 1989	o Turner was suspended without pay.
June 9, 1989	o Warrants to seize funds in the bank account were issued, and $468,000 was ultimately recovered.
	o HUD commenced a civil recovery action to recover all embezzled funds.
June 18, 1989	o A team of Headquarters Staff flew to Denver to commence a review of the entire Regional Accounting Division.
June 21, 1989	o Turner's supervisor, the Regional Accounting Director, was reassigned to nonfinancial duties pending completion of the review.
July 7, 1989	o HUD initiated action to terminate Turner's employment.

Secretary Kemp's Goal

Institute proper accounting procedures for all programs and establish strict accountability for the control of HUD funds.

7. ETHICS AND STANDARDS OF CONDUCT

The ethical conduct of all HUD employees, irrespective of rank or HUD program, is one of Secretary Kemp's highest priorities. Because of this commitment, the Secretary has taken the following actions, in addition to specific program reviews, to ensure that the highest level of integrity in the operation of HUD programs is maintained by all HUD employees.

Actions Taken

February 7, 1989	Instructed Inspector General and HUD Office of General Counsel to hold briefing sessions for new appointees to explain Department's Standards of Conduct.
February 14, 1989	Issued memorandum to all HUD employees emphasizing commitment to high ethical standards. (See Appendix O)
March 2, 1989	Issued new Standards of Conduct guidelines to new appointees. (See Appendix P)
April 17, 1989	Issued new Standards of Conduct booklet to all HUD employees.

June 8, 1989	Placed New York HUD Regional Administrator on administrative leave, pending investigation of a conflict of interest.

In addition, Secretary Kemp is recommending the following policies:

- Prohibiting HUD employee government service in any State or local government agency, board, or panel that does business with any part of the Department or whose work or activities is in any way related to the programs of the Department.
- Terminating all approvals given to any employee since September 1, 1988, for such service, whether or not in conflict with this policy, and established a new case-by-case approval process for any employee wishing to continue to initiate such service.

Secretary Kemp's Goal

From the Secretary on down, employees at HUD will be held to one ethical standard -- the highest.

8. INSPECTOR GENERAL'S AUDITS AND RECOMMENDATIONS

Program Description

The Inspector General Act of 1978 established the Office of Inspector General in several agencies including HUD. The presidentially appointed IG is given independent power to conduct audits and investigations to combat fraud, waste and abuse. The IG reports both to the HUD Secretary and to Congress.

Problem(s)

Recommendations Not Followed: As so many of HUD's program and management problems would indicate, recommendations made through IG audits and investigations have either not been followed or reconciled. In several instances, failure to follow IG guidance has cost the taxpayers millions of dollars.

Outstanding Audit Findings. As of June 21, 1989, there were 846 audit reports with 3,589 recommendations that needed either management decision or final action. The auditors questioned $77,585,239 in the reports needing management decision. Of the recommendations with management decision but lacking final collection action, there was $38,702,663 due HUD and $83,942,864 due to program participants.

Actions Taken

February 7, 1989	o Secretary Kemp met with Inspector General for complete review of all major audits and investigations, and immediately began a program of review and action. (See Appendix Q)

March, 1989 - Present	o	Series of actions taken (as outlined in the preceding summary) to terminate abuses, recover lost or stolen funds and institute both programmatic and procedural reforms.
May 31, 1989	o	Under Secretary DelliBovi assigned to examine and manage procedures for reconciling IG audit findings and implementing recommendations.
June 12, 1989	o	Under Secretary DelliBovi issued directive to all HUD program offices to immediately begin action to close of reconcile all outstanding audit findings and report progress by June 30, 1989. (See Appendices R and S)

Secretary Kemp's Goal

To fully utilize the office of the Inspector General to ensure that HUD operates efficiently and in a manner which maintains adequate control of Federal tax dollars.

(Clerk's Note: Part III, The Appendices, because of its length, has been retained in the subcommittee files.)

Secretary KEMP. You have my commitment to work with you to clean up and to bring about those high ethical standards that you want to see at HUD.

Senator MIKULSKI. Good. I'm going to submit questions related to the Community Development Block Grant 312 and 108 programs, some management, as well as affirmative action related to women and people of color in hiring.

INTERESTED IN INCREASING HOUSING SUPPLY

One of the things, of course, that we're interested in is increasing supply, whether that is private sector, whether that is public sector, whether that is public/private sector, whether we have to borrow on the bond market or whether we have to borrow at financial institutions.

I know that the Federal Reserve is moving to set interest rates—whether you're Mayor of Baltimore going into a bond market or whether you're a young couple trying to get your first mortgage.

The Federal Reserve Board is meeting today and, given the correlation between interest rates and housing starts and housing affordability, if you could talk to Greenspan, knowing that you're an old fashioned supply-sider, what would you say and where do you see that we're heading on this?

Secretary KEMP. Madam Chair, let me say to you that your willingness to entertain the whole question about supply makes Mikulski and Kemp into populist politicians of the nature that I have been trying to push for a long time and I just want to tell you I'm thrilled at the question and your concern about interest.

Because the other night on television I was watching a newscaster to say that he was thrilled about the good news in the economy:

The housing starts were off by 14.5 percent, the premise being that if we can slow down housing starts we can keep inflation under control and it takes incredible—you know, it's a barbaric idea, it's kind of the let-them-eat-cake philosophy of Marie Antoinette. Poor people are going without housing in the fight against inflation.

I think I hear you say that you should not be fighting inflation by reducing the supply of anything because inflation is both a demand and a supply problem, and my long time belief has been to try to increase the supply of housing, increase the supply of jobs, increase the supply of growth and I want to say here before your committee, at least for the record, that growth and prosperity are not the causes of inflation, inflation is not caused by building houses, it's not caused by men and women getting jobs.

All the time we hear folks say we've got to hold down the economy's growth in order to pursue an antiinflationary policy. I find that barbaric and it is not consistent with your philosophy any more than it is mine.

My advice to the Fed—although they haven't asked—if the dollar continues to rise, if commodity prices continue to stay relatively stable, if, excuse the expression, the price of gold stays where it is over time——

Senator **Mikulski**. Don't take me into the gold. [Laughter.]

Secretary **Kemp**. I'm not. I take full responsibility but—and if the exchange rates—I would look at all this basket of prices and if they continue as they have been, I would not panic over the short-term PPI prices, WPI, CPI, and I would suggest the Fed today might be encouraged to soften—to lower the interest rates over which they have direct control, i.e., the overnight cost of money to the Federal funds rate. And an easing by the Fed, a willingness to bring down short-term rates, would have a benign positive impact upon long-term prime and 30-year T-bills and mortgage rates.

I would strongly urge that—or at least suggest—that they overreacted to the short-term indices, CP and PPI, and that they should be easing and I think it would be good for housing and it would be good for commodities, I think it would be good for the economy, I think it would be good for the poor and I particularly believe it would be good for our budget deficit problem because you and I cannot reach an agreement over long-term budget projections, i.e., deficits, without some easing of interest rates, notwithstanding what it would do for Mexico and the third world and Latin countries.

Senator **Mikulski**. Well said.

Secretary **Kemp**. I thought so. [Laughter.]

SUBMITTED QUESTIONS

Senator **Mikulski**. Well, thank you. I think these hearings have been very informative, we've covered a great deal of ground and we look forward to further work with you. We anticipate that the urgent supplemental will be acted upon in the House here before the end of the week.

We will submit the balance of the questions for your response.

Secretary **Kemp**. Thank you.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED BY SENATOR BARBARA A. MIKULSKI

MODERATE REHABILITATION INVESTIGATION

SENATOR MIKULSKI: When was the subject of excessive use of consultants in the mod rehab program brought to your attention? Did this tip come from within the Department?

ANSWER: The rumored widespread use of consultants was initially mentioned during our interviews with various HUD program managers and officials. However, no specific details were presented to us until March 1988, when a HUD employee (confidentiality requested) provided specific information regarding a developer's payment of substantial fees to a consultant on a contingent fee basis. Thereafter, we questioned developers regarding consultant fees for those projects we tested during the audit.

SENATOR MIKULSKI: A Washington Post story [4/27/89] says that these abuses have been going on for as much as 5 years. Why wasn't your office involved earlier and what internal controls of the program were supposed to exist to avoid this kind of abuse?

ANSWER: Abuses concerning Public Housing Agency (PHA) rent computations have existed since program inception and were subjects of previous OIG audits and even a Congressional hearing (spring 1986). The 5-year reference concerns the flawed Headquarters selection process. Although we planned to audit the Moderate Rehabilitation Program (MRP) early in Fiscal Year 1987, other priorities pushed the audit into Fiscal Year 1988. The regulations contain requirements (controls), however, the regulations were not followed as noted in Finding 1 of our audit report.

SENATOR MIKULSKI: Who within the Department was responsible for reviewing mod rehab grant applications to prevent these kind of overcharges? How high in the Department did any of these awards come from? Did they go as high as the Secretary's office? Why didn't they detect these excessive consultant fees in the first place? Did grant applicants "hide" the level of these fees on their applications or was there simply no inquiry into this kind of assistance to an applicant?

ANSWER: During our audit period all MRP allocations were made in Headquarters by individuals who reported directly to Secretary Pierce. Formal MRP applications were not used as a basis for funding allocations. Rather, a PHA letter request, without any breakout of costs, fees or other specific information, was used to spell out an interest in obtaining MRP funds. Consequently, there were no reviews for the types of overcharges implied by the question.

Once an award was made, HUD Field Office staff had the responsibility for reviewing applications, project selection, rent computations, etc., for projects larger than 50 units. However, since consultant fees are specifically identified in HUD Handbooks as being ineligible, the fees were not included in PHA applications. Moreover, since the fees were paid by developers, HUD has little or no authority to question such fees as long as they were not included in project costs.

SENATOR MIKULSKI: Are any of the abuses you've found in your investigation subject to criminal prosecution?

ANSWER: Because we felt that many of the circumstances disclosed by our investigation appeared to be serious, we provided a copy of the report to the Department of Justice where it is still under review for a determination as to whether criminal prosecution is warranted.

SENATOR MIKULSKI: While you don't make policy, what steps do you think need to be in place to prevent further abuses like this?

ANSWER: I think the Department should implement the recommendations made in our audit report and also place tighter restrictions on HUD officials, developers, and consultants.

Our audit report made 21 recommendations and the Department has concurred in 19 of these recommendations. We are still discussing two of the recommendations with HUD officials. One concerns tax credits; the other calls for a better definition of what constitutes a "moderate" rehabilitation. We have recommended that HUD recognize the value of low-income tax credits in rent calculations and, thereby, reduce subsidies on assisted projects. We also recommended that HUD define "moderate" rehabilitation in terms of dollars and/or scope limitations on eligible rehabilitation costs, in order to contain costs within reasonable limits.

We also suggested that Secretary Kemp consider proposing new restrictions on HUD officials, developers, and consultants. These restrictions would be modeled on Public Law 100-679, Section 27, "Procurement Integrity," which tightened the rules for procurement officials, contractors, and consultants. The Department is still considering this suggestion.

SENATOR MIKULSKI: This ongoing investigation reports widespread abuse in the program, with some consultants receiving as much as $1,500 per unit. Should the committee take steps to limit the role of consultants?

ANSWER: I recommend that the Committee examine the legislation passed to curb consultant abuses found in the procurement process at the Department of Defense. The situation found at Defense was similar to the problems found at HUD, except that in HUD we uncovered no evidence showing HUD officials received anything of value from the consultants in return for inside information and favored treatment. Nevertheless, the new restrictions in Public Law 100-679 may be instructive as to how to fashion new legislation pertaining to HUD awards, grants, insurance, and subsidies.

SENATOR MIKULSKI: What steps are you going to take to guarantee that future mod rehab awards are based on merit, not on the old boy network?

ANSWER: The Department is determined to design a new allocation system that is fair to all competing PHAs and will eliminate the old boy network. The staff of the Office of Inspector General (OIG) will also review these new procedures before they go into place and will provide Secretary Kemp any additional suggestions at that time.

SENATOR MIKULSKI: Do you expect to find further examples of abuse in the mod rehab program before you have finished your investigation?

ANSWER: Our Office of Audit is currently conducting audits involving an additional nine PHAs. Preliminary data show that at all nine PHAs the rents are excessive by large amounts.

BUSH/KEMP HOUSING POLICY

SENATOR MIKULSKI: What are your plans for developing a national housing policy? And how do you plan to make HUD a central point for the development of such a policy?

ANSWER: HUD has begun to examine its national housing policy by establishing Departmental priority areas. Each priority has a designated coordinator with cross-program responsibility. All budget and legislative proposals developed as part of the fiscal year 1991 budget process and all new research undertaken will be analyzed and evaluated in terms of the Departmental priorities. The priorities are to: expand homeownership and affordable housing opportunities; create jobs and economic development through enterprise zones; help end the tragedy of homelessness; empower the poor through resident management and homesteading; enforce fair housing for all; and make public housing drug free.

SENATOR MIKULSKI: I commend President Bush for fully funding the McKinney Act, which deals with homeless assistance. But homeless assistance is no substitute for permanent housing. Now that the President has shown he wants to tackle the homeless problem, when will he lay out specific plans and back them with the necessary resources (for) housing?

ANSWER: We are currently reviewing HUD's subsidized, permanent housing programs as part of the process of developing the President's Fiscal Year 1991 Budget. Specific plans will be included in the forthcoming Budget proposals.

RESOURCES FOR NEW ENERGY AT HUD

SENATOR MIKULSKI: You have brought new energy to HUD and to housing, but where do you plan to get the resources to implement all of your ideas?

ANSWER: As I have stated in my testimony, the Department must use its full resources to wage war on poverty. Yet, the Federal Government cannot and should not wage this war alone. There is great potential for private sector entrepreneurs and neighborhood self-help organizations to provide new opportunities for all Americans. Where Federal money is necessary, we will fight for it, but program dollars which are made available should maximize the leverage of non-Federal investment.

SENATOR MIKULSKI: A GAO study done for this Subcommittee earlier this year found that vouchers were 7 percent more costly than certificates.

Do you agree with GAO's findings that converting expiring existing certificates to housing vouchers may cost the government an additional $9.6 billion over the next 12 years?

ANSWER: HUD does not agree with GAO's findings that converting certificates to housing vouchers could cost an additional $9.6 billion over the next 12 years. The GAO study looked at the difference in cost during the first year of a demonstration program. It also made some incorrect assumptions concerning the operation of both the certificate and voucher programs. The costs of the certificate and voucher programs are believed to be about the same over the long term.

RENEWAL CONTRACTS: LENGTH OF RENEWAL

SENATOR MIKULSKI: A new authorization combining vouchers and certificates won't pass before we act on our 1990 appropriations bill. What would the Department recommend as the length for which existing certificates be renewed, 5 years, 15 years, or something else? [Follow-up: Is your answer prompted more by budget concerns or policy considerations?]

ANSWER: The Department has reviewed the entire renewal situation and believes that five years is the appropriation length of time for renewing certificates. Estimates of refunding needs have changed since the budget was submitted, and the Department now recommends a $1.1 billion level for the in-kind renewal of all expiring units for a five year period, although, of course, we are continuing to review our policies.

From a budgetary--or more specifically--an outlay standpoint, it makes no difference for how long contracts are renewed. Outlays in any year will remain the same regardless of the term of renewal. From a programmatic standpoint, however, it makes little sense to attempt to extend tenant-based subsidy contracts for terms in excess of five years since there are so many variables that could change the subsidy level. Five years is about the maximum that a projection can be made that can be lived with without amendment later.

PUBLIC AND INDIAN HOUSING MODERNIZATION

SENATOR MIKULSKI: Public housing modernization funds are one of the few sources available to fight the war on drugs. I think a limited use of these funds for this purpose is legitimate and appropriate. But the Bush request for modernization is only $1 billion, over 40% below last year's appropriation. Isn't that a contradiction in your efforts? Don't we need much more in this area?

ANSWER: The Department requested $1 billion because, as of September 30, 1988, $3.2 billion of Modernization and Major Reconstruction funds which had been approved by HUD remained unobligated (contracts not awarded) by Public Housing Agencies (PHAs) and Indian Housing Authorities (IHAs). The following table reflects the distribution of those funds by fiscal year of approval by HUD.

FUNDS UNOBLIGATED AS OF SEPTEMBER 30, 1988

FISCAL YEAR OF APPROVAL BY HUD	FUNDS UNOBLIGATED BY PHAS/IHAs (In Millions)
1975 through 1987	$1,465.2 a/
1988	1,778.8 b/
Total	3,244.0

a/ Includes $56 million approved before fiscal year 1985.
b/ Approved by HUD during September 1988.

SENATOR MIKULSKI: What kind of need for public housing modernization exists and what annual level for this account is appropriate? The Abt study HUD commissioned several years ago said the need was $20 billion, just to prevent the stock from suffering further deterioration.

ANSWER: The following table shows the various components of need in 1990 dollars derived from the Abt report. The total need for funding depends upon which of these components is included in the total. The Department will present its recommendation for annual funding in the fiscal year 1991 Budget.

1990 ESTIMATES OF DIFFERENT COMPONENTS OF UNFUNDED BACKLOG AND ACCRUAL NEEDS

BACKLOG BY ACCRUAL CATEGORY	UNFUNDED BACKLOG OF NEEDS	AGE-SPECIFIC ACCRUAL NEEDS	EXTRAORDINARY ACCRUAL NEEDS
	(In Billions of 1990 Dollars)		
MANDATORY BACKLOG NEED			
Fix......................	$12.15	$1.76	$.61
Mandatory Adds...........	.55	.01	...
Lead-Based Paint.........	.36	...	...
Handicapped Accessibility	.30	...	...
Total..................	13.36	1.77	.61
PROJECT-SPECIFIC ADDS......	5.89	.01	...
ENERGY AND REDESIGN NEEDS			
Redesign.................	2.39	NA	...
Energy Conservation......	.63	NA	...
Total..................	3.02	.01	...

PUBLIC AND INDIAN HOUSING OPERATING SUBSIDY FORMULA AND DRUG PREVENTION

SENATOR MIKULSKI: You currently compute the level of operating subsidies which Public Housing Authorities need through what is called the Performance Funding System (PFS). Does the PFS system need revision to reflect the higher costs in dealing with drug-related problems?

ANSWER: No. Security needs vary widely from Public Housing Agency (PHA) and Indian Housing Authority (IHA) to PHA/IHA depending upon tenant demographics, the nature of the relationship with local law enforcement, the degree of drug problems, and so forth. A formula-based allocation system such as PFS could not take into account the wide variations in local needs and approaches which would be necessary in properly addressing drug-related problems.

SENATOR MIKULSKI: Are you performing the analysis and cost estimates to enable PHAs to combat drugs that were called for in last year's omnibus drug bill? If so, when can we expect to see it?

ANSWER: The Department has submitted its report to the Congress on Public Housing Security Expenditures and the Performance Funding System pursuant to Section 5102 of Subtitle C (Title V) of the Anti-Drug Abuse Act of 1988 (P.L. 100-690) enacted November 18, 1988. No cost estimates were prepared in carrying out this analysis because determining the level of funds that a PHA/IHA might require to combat drug-related security problems effectively is highly subjective and varies widely among PHAs/IHAs. If additional funds were to be made available to PHAs/IHAs for security enhancement and anti-drug activities, the system of allocating such funds should be responsive to the wide variations in security issues and needs among PHAs/IHAs. Specifically, the program should be based on competitive grants and not be a formula-driven system.

CONTRACT RENEWALS

SENATOR MIKULSKI: In fiscal year 1991, the number or renewals jumps from 23,000 to almost 300,000. I'm told that some of these 1991 contracts will actually have to be renewed in 1990. Is that true, how many units will it involve and how much would it require us to add to the budget?

ANSWER: The Department's budget estimates assumed that only those contracts expiring in FY 1990 would have be be renewed. After further experience in 1989, we find that some 1991 expiring contracts will have to be funded in 1990. Administrative processing time is needed prior to the expiration of units to ensure that new contracts are in place and to prevent any lapse in subsidy assistance to tenants.

For the loan management, property disposition, certificate and voucher contracts, funding is needed in 1990 to allow for contracts which actually expire in October 1990 (1 month in advance).

For 1991 expiring certificate contracts, funding will be needed 2 months in advance (for October and November of 1990).

The total number of unit renewals on this basis would be 42,167, some 18,523 more than originally estimated for 1990. The total budget authority requirement to do this is $1.1 billion compared to the $667 million requested in the January Budget. We are, of course, continuing to look at this.

SENATOR MIKULSKI: This 1991 problem which affects the 1990 Budget wasn't known when the Budget Summit Agreement was finalized. Will we get a budget amendment from the Administration to deal with the problem?

ANSWER: The 1990 Budget of $667 million understated the budget authority necessary to replace or renew expiring contracts by assuming that funding would be provided for a contract in the same year that it would expire. However, current estimates reflect the need to fund contracts somewhat in advance of the actual expiration to ensure uninterrupted assistance to affected families and to meet statutory requirements for entering into leases.

The Department has assessed various options in reference to the revised funding requirements and believes that the $1.1 billion provided in the Budget Summit Agreement will be adequate for the current estimate of costs to fund all 1990 renewals, which have not already been handled in 1989, plus the early 1991 expirations which need to be refunded in 1990. The Appropriations Committees will be officially notified of the revised requirement. We are, of course, continuing to look at our policies in this regard.

SENATOR MIKULSKI: Does the Department have a position on vouchers v. certificates?

ANSWER: The Department believes that certificates and vouchers have both been major advances over new construction programs, developer subsidies, and project-based assistance. Certificates and vouchers both direct assistance to the tenants utilizing the existing housing stock and both programs significantly enhance tenant choice. Both programs see affordability, not housing availability, as the chief problem facing most low-income families. The Department believes that vouchers best further the goals of choice and empowerment by giving tenants maximum ability to choose the neighborhoods in which they want to live, as well as the appropriate level of rent burden they choose to bear. However, HUD is currently reviewing both voucher and certificate programs to determine what, if any, improvements can be made.

RENEWAL CONTRACTS: VOUCHERS V. CERTIFICATES

SENATOR MIKULSKI: There's been much talk about combining the best of both programs. What are the best elements of both which you would like to see in combined into a single form of subsidy and why?

ANSWER: There is much truth to the argument that it is administratively burdensome to local public housing agencies to continue to operate both the certificate and housing voucher program. It would be advantageous to merge the programs, and we are in the process of examining ways to do this. However, administrative simplicity is not our only goal. Giving low income tenants maximum choice and flexibility continue to be major goals. In a varied real estate market, we need to explore ways to offer various housing tools to meet the housing needs of low-income families.

The original design of the voucher program was built on a foundation of the certificate program, and in that sense all of the essential features of certificates (i.e., family-based assistance, utilizing the existing housing stock, aimed at the middle of the market, etc.) have already been retained in vouchers. The certificate program generally limits family rent burden at 30 percent of adjusted income. The voucher program places no upper limit on rent payments. The family should decide how much to pay for housing. We believe that giving tenants incentives to shop around for housing, allowing them to share in savings by moving into housing that rents for less than the payment standard, offers major benefits to low-income people. But we are aware that some people believe that counselling could be useful to families receiving vouchers. We are looking at these possible variations on the tenant-based assistance programs.

Contract Renewals

SENATOR MIKULSKI: One of the concerns with these renewals is the tremendous unevenness with which they expire.

Last year we had 1,000 or so renewals, this year, 23,000, next year, 295,000 and so on. Are you developing a plan to even out the number of contracts that expire in a given year so we have roughly the same number expire per year?

ANSWER: The Department does not see the evening out of expirations as a viable option. To accomplish such an objective would require renewing contracts for a short period of time which would be a very large administrative burden because of the increased number of contracts (ACCs) that would have to be processed. The other alternative would be to extend certain contracts or funding increments for longer periods of time to effect an even spread of expirations. This, however, would require significant amounts of budget authority over the next few years to accomplish.

SENATOR MIKULSKI: What is the total number of 221(d)(3) or 236 mortgages you expected to be pre-paid?

ANSWER: HUD surveyed eligible projects including an assessment of the likelihood for prepayment. A total of 359,600 units are eligible to prepay, 156,736 units are involved in projects that will or are likely to prepay.

SENATOR MIKULSKI: Does HUD's number on prepayment differ from the figures cited in the Hills-Reuss study? And if so, why?

ANSWER: HUD's estimate is 2 percent lower than the figure quoted in the Hills-Reuss study. This is probably the result of updates to the database, particularly reviews that determine a project was initially developed under a non-profit sponsor. Such projects are recorded as ineligible to prepay. The following compares HUD's most recent figures for projects that are eligible to prepay and the figures from the Hills-Reuss study:

Program	HUD Estimate	Hills/ Reuss	Difference
Section 236................	260,724	253,000	- 7,724
Section 221(d)(3)BMIR.....	73,667	94,000	+20,733
Section 221(d)(3)MIR......	25,172	19,500	- 5,672
Total..................	359,563	366,900	+ 7,337

PREPAYMENT OF 221-D-3 AND 236 MORTGAGES

SENATOR MIKULSKI: Have you undertaken negotiations with the authorization committee to deal with this problem?

ANSWER: We have begun negotiations and will continue to do so.

SENATOR MIKULSKI: Can I have your assurance that you won't sign off on any solution with them unless you are prepared to go to the President to get the money needed to implement the plan?

ANSWER: We are faced with unusual problems in providing housing assistance for low-income people. Solving the issue of mortgage prepayments is the most challenging of these problems. The cure will cost money. To the extent that this Department seeks additional appropritions or alternative funding means to support policy goals, we will always consult with both the Senate and House Appropriations Committees.

NEHEMIAH HOUSING OPPORTUNITY GRANTS

SENATOR MIKULSKI: Given that you have been diligently working on the regulations and are supportive of the regulation changes - will we be seeing Administration interest and funding for the Nehemiah program in the future?

ANSWER: At this point, we do not yet know whether future funding will be sought for the Nehemiah program. During 1990, the Department will evaluate the program and make necessary recommendations for changes and/or funding for it.

SENATOR MIKULSKI: You are requesting about $2.9 billion for the Community Development Block Grant program, about $100 million less than what we appropriated last year.

Of this total, however, $86 million is to be transferred from the 312 program, and $50 million from what's left of the UDAG program.

Since CDBG is so important to governors, mayors and local officials, shouldn't it have at least a $3 billion appropriation?

ANSWER: The Administration has proposed a cut in the Community Development Block Grant (CDBG) appropriation, amounting to less than 4 percent of the 1989 level. This is consistent with the Administration's intent to reduce Federal spending to a level that will meet our deficit reduction targets.

SENATOR MIKULSKI: You have requested $50 million in the Community Development Block Grant program for a new Homeless initiative. Could you give us some specifics on this new initiative -- how does it differ from existing homeless programs other than it's strictly discretionary? How will it be targeted to reach the most needy among us?

ANSWER: We intend to use these funds to support locally designed comprehensive strategies to address communities' most critical homeless needs by permitting a wide range of eligible activities. The key here is the use of the term "comprehensive." Each of the existing programs is targeted to a specific aspect of the homeless issue--emergency shelters, transitional housing, permanent housing for the homeless handicapped, and single room occupancy. While each has a requirement to include supportive services, none offers the full range of services needed to move the homeless to full, productive lives. The program will require a one-for-one dollar match with a high grant ceiling, thus enabling recipients to mount a full scale effort to address their most vexing issues. A formula approach would distribute the funds to too many recipients, thus reducing the impact possible in a single community. To ensure targeting to the most needs, applicants will have to identify the target population based on a local assessment of needs and existing resources. Thus, we will ensure the funds go to those segments of the local homeless population that are most in need of assistance and are not currently being assisted. We will insist on the involvement of local private organizations and non-profit providers to ensure that the most comprehensive approach possible is undertaken.

SENATOR MIKULSKI: While you are planning to give the Community Planning and Development Office more responsibility for homeless programs, you are proposing to cut their staffing level by almost 100 positions. Isn't this a contradiction--how do you expect to implement these initiatives with fewer staff?

ANSWER: The staffing reduction does not reflect the President's homeless initiatives nor does it reflect additional responsibilities for homeless programs. The amount of Community Planning and Development (CPD) staff actually needed for 1990 will depend on Congressional action on the Administration's proposals to terminate several CPD program; Congressional action on the Bush homeless initiatives; and finally, the actual role and responsibility of CPD with regard to other homeless programs.

SENATOR MIKULSKI: The President's budget proposes to transfer the Emergency Food and Shelter Program from FEMA to HUD. Why should we transfer this program when a GAO report released last Friday suggests that HUD has had trouble releasing funds in a timely fashion to homeless groups, while FEMA has been relatively successful?

ANSWER: GAO's comments with respect to disbursement of funds under various homeless programs need to be understood in the context of these programs--it is not an issue of HUD's awarding of funds to grantees, but rather local recipients being slow to expend the funds--i.e., funds are available for expenditure, but have not been drawn down. HUD's programs involve construction which, by its very nature, is a slower process. Nevertheless, the Department will be taking steps to expedite the use of HUD funds by recipients.

On the other hand, FEMA's Emergency Food and Shelter program is primarily a non-construction program and these funds are typically used more quickly; and, should HUD assume administration of the FEMA program, those funds would continue to flow as quickly as they have in the past. The transfer would strengthen program implementation by making a single agency--HUD--responsible for all homeless shelter programs. HUD will establish a partnership with the "National Board" to strengthen the Emergency Food and Shelter program and the National Board will continue to perform an integral role in administering the program. This program also has a statutory provision to obligate all funds to the National Board within 30 days of the appropriation. The provision would remain unchanged, so there is no doubt the funds will continue to be distributed expeditiously.

SENATOR MIKULSKI: What are the advantages of transferring this program (EFS) to HUD and how do you plan to address the concerns of non-profit groups who prefer their current arrangement with FEMA?

ANSWER: Transfer of the Emergency Food and Shelter program to HUD will result in improved coordination of the Federal Government's response to the homeless. Our relationship with State and local governments, and non-profit providers through our many programs, will enable us to better coordinate homeless programs. We now, of course, work closely with those organizations currently included in the FEMA program. We believe non-profit providers play an important role in resolving the homeless issue and would not want to see a reduction in the level of involvement and support provided by those agencies. They will continue to be fully involved in the process and any changes we might want to consider.

SENATOR MIKULSKI: There have been many criticisms regarding the Interagency Council for the Homeless by GAO and others. Now you are the Council's new Chairman.

What did GAO identify as the Council's problems and how do you plan to address them?

ANSWER: In testimony before the House Subcommittee on Government Activities and Transportation and the House Subcommittee on Employment and Housing, GAO reported on the status of the Council. GAO asserted that the Council's efforts to meet its statutory responsibilities were both inadequate and ineffective. GAO also criticized the Council for not making any funding recommendations and for not providing State and local organizations with critical information in a timely manner.

As Chairman of the Council, I am firmly committed to fulfilling the intent of the McKinney Act, as amended. The Council is addressing the problems cited by GAO and others. The newly appointed staff has been assessing Council operations and has initiated numerous changes to improve the responsiveness to the users of the McKinney programs and other Federal programs for the homeless. For example, the Council's bi-monthly bulletin now provides timely information on a more comprehensive set of relevant Federal programs and activities. Another change that will facilitate providing useful and timely information to homeless organizations is my designation of ten full-time Regional Coordinators. They are now in place and have been orientated on their roles and responsibilities.

The Council staff is also developing a monitoring and evaluation method to review homeless programs and activities in order to make recommendations for improvements. As an Interagency Council, we have had numerous working meetings, many of which have been issue specific, to discuss how we can better coordinate Federal homeless activities and better serve homeless individuals and families. The Council is keenly aware of the need to be effective and is actively engaged in ensuring that the Council is a pro-active advocate for the homeless.

SENATOR MIKULSKI: Your Budget indicates that you are requesting $1.2 million, the full amount authorized by the McKinney Act, for the Council.

In light of the Council's inability to act expeditiously in the past, why should we provide it with additional funds?

ANSWER: As I have stated in the testimony before Committees in the Senate and House, and to a variety of constituent groups, President Bush and I have made solving the problem of homelessness a top priority. Under my leadership, the newly constituted Council has been actively pursuing a coordinated approach to improve its ability to respond to the needs of organizations that serve the homeless and homeless Americans themselves. Because the Council members are committed to addressing the tragedy of homelessness, I can assure you that the Council will succeed. In order to realize that success, the Council will need the $1.2 million the President has requested for the Council's operation in 1990.

SENATOR MIKULSKI: Why does the President's budget propose raiding two other community development programs (312 & UDAG) to pay for CDBG? Isn't this simply another instance of robbing Peter to pay Paul in housing and community development?

ANSWER: The Administration is not "robbing Peter to pay Paul" in housing and community development. The proposals to terminate the Section 312 and UDAG programs are longstanding and now appear to have Congressional support. This was evidenced by Congressional action on the 1989 Budget whereby $200 million of Section 312 funds were approved for transfer to CDBG and no new funding was approved for UDAG. We believe that the Congress now agrees that we cannot afford to run three duplicative programs in this time of high budget deficits and our 1990 proposals continue down the path begun in the 1989 Appropriations Act.

SENATOR MIKULSKI: The Department's proposed reductions for CDBG are not as severe as in certain other areas of the HUD budget.

But after you take out all of the set-asides for one discretionary activity or another, the entitlement portion of CDBG funds (that which goes by formula to large and small cities) is cut by almost $200 million.

Aren't these entitlement funds a higher priority, because they go directly to communities to use themselves, than these proposed discretionary set-asides?

ANSWER: Entitlement funding to large cities and urban counties, along with grants to States for small cities, are the chief priorities of the CDBG program. However, the Department also believes a modest amount of funding for discretionary purposes is desirable. The set-aside of discretionary funds will be targeted to directly benefit lower income households or to fund priority needs of our grantees. Such specific targeting is not found consistently in the use of CDBG funds by our entitlement grantees. In President Bush's messages to Congress of March 18, 1989, and May 18, 1989, two discretionary programs were proposed. One is to directly assist communities in testing innovative solutions to housing and serving the homeless. Another is to directly aid lower income households residing in assisted housing to become homeowners. We expect the expenditures of those discretionary funds to generate examples of good community development practices of nationwide significance. We also expect to include this as one of our decision making criteria in the distribution of these funds.

The balance of the discretionary set-aside includes funding for Indian tribes, The Trust Territories, technical assistance to grantees, and a small amount for special projects.

SENATOR MIKULSKI: The President's budget funds neither the Child Care Demonstration in Public Housing or the Neighborhood Development Demonstration Program.

These are two favorite and highly successful undertakings sponsored by this Subcommittee.

Why were they eliminated from the budget, particularly when you have proposed such large increases for CDBG discretionary funds?

ANSWER: The decision not to seek additional funding for these demonstrations was made prior to the proposals to increase CDBG discretionary funding. The increase of $94 million is specifically for the President's Homeless and Homeownership initiatives to provide additional housing assistance to the needy. While we acknowledge that the Child Care and Neighborhood Development Demonstrations may provide some useful results, we do not yet know enough to advocate continuing these programs on a "permanent" basis. Rather, we suggest that it is best for the Congress to await the results of the evaluations of the Demonstrations before providing additional funds, particularly in times of scarce resources.

CHILD CARE DEMONSTRATION PROGRAM

SENATOR MIKULSKI: Why have you eliminated the Child Care Demonstration for public housing tenants despite the fact that this program is key for single parents who need the flexibility to look for work? What have you based your decision on and have you conducted an evaluation to determine the feasibility of such program?

ANSWER: The Public Housing Child Care Demonstration Program was authorized for only fiscal years 1988 and 1989 by Section 222 of the Housing and Urban-Rural Recovery Act of 1983, as amended.

Due to Research & Technology budget constraints, an evaluation will begin in FY 1990 and will completed in FY 1991. The report will set forth the findings and conclusions as a result of carrying out the demonstration program.

SENATOR MIKULSKI: The President's budget proposes terminating two community development programs in FY 90: the 312 rehabilitation loan fund program and the section 108 loan guarantee program.

Why has the Department proposed to cut these funds when the Department's own reports indicate that the programs are working well?

ANSWER: The Section 312 program duplicates assistance which can be more effectively provided under the CDBG and Rental Rehabilitation Grants programs. The Section 108 program is not necessary to enable cities to borrow funds for their acquisition and development projects and the program also distorts financial loan markets.

SENATOR MIKULSKI: The 312 program has been effective in cities like Baltimore, particularly when it is coupled with urban homesteading efforts.

Why not renew the Department's commitment to this kind of effort and work with non-profit groups to restore homes in dilapidated homes in cities like Baltimore?

ANSWER: The Department believes that the CDBG and Rental Rehabilitation programs provide an appropriate level of Federal resources for housing rehabilitation. The Section 312 program is simply not a cost-efficient means of providing rehabilitation assistance and the program is a staff-intensive one for localities to run.

SENATOR MIKULSKI: You are planning to terminate the Section 108 Loan Guarantee program. Why are you planning to eliminate these loan guarantees?

ANSWER: The Department believes that a Federal program of this type is unnecessary and an inappropriate Federal intrusion into private financial loan markets. Localities are able to borrow funds on their own without a Federal guarantee. This program is not needed.

SENATOR MIKULSKI: You have requested $44 million in the Secretary's Discretionary Fund to promote homeownership opportunities. You have specified that initiatives will include homeownership counseling services and innovative projects to promote homeownership opportunities. Could you describe what these counseling services will involve? What types of innovative projects do you have in mind to help promote homeownership opportunities?

ANSWER: This new initiative is intended to promote homeownership opportunities for lower income families through a $44 million add-on to the Secretary's Discretionary Fund of CDBG. All families assisted would be lower income (below 80 percent of area median income), but the selection process would favor projects benefitting mainly very-low income families (below 50 percent of area median).

Types of housing eligible for funding would include single and multifamily units currently owned by private investors, by non-profits, or by public housing authorities, and which would be converted either to fee simple homeownership or to low-income cooperatives or condominiums.

Uses of funds would include grants or loans for acquisition costs and rehabiltiation costs; technical assistance counseling (including organizational development of resident management corportations, training in homeownership skills, and legal and other costs for conversion of projects to homeownership); and project operating and replacement reserves.

Proposals would be selected competitively and ranked on the basis of a number of innovative factors, including extent of targeting to very-low income families, resonableness of project costs, amount of funding from sources other than the special homeownership fund, amount of funding from non-Federal sources, the extent to which relocation is minimized, and the likelihood that the project will succeed in achieving homeownership within a reasonable period of time.

SPECIAL PROJECTS FUNDED WITH FY 1989 FUNDS

SENATOR MIKULSKI: You are requesting $12.2 million for special projects in the Secretary's Discretionary Fund. Please provide us with a list of projects, a brief description and amount for each project.

ANSWER: The Department requested $3 million for the 1989 Special Projects program, but received $12.25 million. The additional $9.25 million was earmarked for specific projects in the Conference Report on the FY 1989 Appropriations Bill.

The two lists below identify the projects to be funded with fiscal year 1989 funds as selected by HUD and those mandated in the Conference Report.

PROJECTS SELECTED BY HUD

1. Applicant: Greenville, MI
   Amount Approved: $350,000
   Total Project Cost: $2,164,889
   Purpose: To provide some of the financing for Greenville West, a commercial project. The project includes construction of a 22,204 square foot facility for a J C Penny store. An additional 20,000 square feet of retail space will be built adjacent to the J C Penny store. A total of 84 jobs will be created by this project.
2. Applicant: Johnstown, PA
   Amount Approved: $350,000
   Total Project Cost: $600,000
   Purpose: To complete activities which are a part of the general economic development process begun in this community following the flood of 1977. Projects/activities to be assisted include:
   (a) acquisition, clearance and preparation of a site for public open space or future expansion;
   (b) construction of public and private improvements with other public and private improvements in the immediate area, and
   (c) public improvements and beautification.

3. Applicant: Washington, DC
   Amount Approved: $500,000
   Total Project Cost: $5,200,000
   Purpose: To fund Peoples Involvement Corporation's (PIC) redevelopment of the Colony Theater, located at 4931-4935 Georgia Avenue into a mixed use development that will include 4,270 square feet of retail space, 2,168 square feet of parking space to be operated on a commission basis, and 50 units of rental housing for senior citizens.
4. Applicant: Omaha, NB
   Amount Approved: $250,000
   Total Project Cost: $3,700,000
   Purpose: To construct a residential and active treatment center for adults. The facility will contain 6 residential units housing 8 individuals and a 20,000 square foot community re-entry program center and will generate 85 jobs.
5. Applicant: Erie, PA
   Amount Approved: $100,000
   Total Project Cost: $1,050,000
   Purpose: Reconstruction of the Franklin Avenue Bridge and upgrading Downing Avenue to accommodate increased traffic during bridge construction.
6. Applicant: Yakima, WA
   Amount Approved: $400,000
   Total Project Cost: $12,123,084
   Purpose: To construct and equip a high technology hops extraction processing plant. The Special Projects grant will be loaned to the developer for equipment leasing.
7. Applicant: Knoxville, TN
   Amount Approved: $220,000
   Total Project Cost: $220,000
   Purpose: For acquisition of blighted property and the making of public improvements. The public improvements include construction/reconstruction of streets and sidewalks.
8. Applicant: South Bend, IN
   Amount Approved: $50,000
   Total Project Cost: $50,000
   Purpose: To rehabilitate and expand the LaSalle Park Child Care facility.
9. Applicant: Honolulu, HI
   Amount Approved: $400,000
   Total Project Cost: $600,000
   Purpose: To rehabilitate the 48-unit Quinn Lane Shelter for the homeless. The project involves the repair and reconstruction of the facility to improve health and safety conditions for clients of the shelter.
10. Applicant: Jackson, MS
    Amount Approved: $50,000
    Total Project Cost: $50,000
    Purpose: To renovate and expand the Power House for homeless young women.
11. Applicant: Santa Barbara County, CA
    Amount Approved: $190,000
    Total Project Cost: $1,028,987

Purpose: To assist in the development of 14 one-bedroom senior citizen apartments for very low-income persons.

12. Applicant: Santa Barbara County, CA
    Amount Approved: $70,000
    Total Project Cost: $155,000
    Purpose: To acquire a single family dwelling to provide transitional housing for the homeless of Santa Monica.

Total of Approved Projects: $2,930,000
Balance Uncommitted: $70,000

PROJECTS IN THE CONFERENCE REPORT

1. Applicant: Oklahoma City, OK
   Amount of Request: $1,000,000
   Total Project Cost: $23,303,899
   Purpose: To fund the creation of a Statewide math and science high school. The funds will be used to pay part of the cost of acquiring a 30-acre tract in a depressed area of the city.
2. Applicant: Merced, CA
   Amount of Request: $366,667
   Total Project Cost: $426,666
   Purpose: To provide secondary migration assistance for Southeast Asian refugees in the City of Fresno and Merced and Stanislaus Counties, California. The three entities are applying separately. Not yet approved.
3. Applicant: Fresno, CA
   Amount of Request: $366,667
   Total Project Cost: $366,667
   Purpose: To provide secondary migration assistance for Southeast Asian refugees in the City of Fresno and Merced and Stanislaus Counties, California. The three entities are applying separately. Not yet approved.
4. Applicant: Stanislaus, CA
   Amount of Request: $366,666
   Total Project Cost: $366,666
   Purpose: To provide secondary migration assistance for Southeast Asian refugees in the City of Fresno and Merced and Stanislaus Counties, California. The three entities are applying separately. Not yet approved.
5. Applicant: Philadelphia, PA
   Amount of Request: $2,885,000
   Total Project Cost: $5,562,772
   Purpose: To be divided proportionally to address the serious ground subsidence problems in the Roxborough and Logan areas of Philadelphia. The funds are to be matched by equal contributions from both the City and the State.
6. Applicant: Dayton, WA
   Amount of Request: $140,000
   Total Project Cost: $1,500,000
   Purpose: To provide handicapped accessibility improvements

to the Columbia County Courthouse. Not yet approved.

7. Applicant: Henderson, NV
   Amount of Request: $1,560,000
   Total Project Cost: $3,775,000
   Purpose: To provide funds for the modification and repair of an innovative wastewater treatment facility. This facility is a crucial component of the city's economic development efforts and will serve as a model for water reuse projects in other desert communities. Not yet approved.
8. Applicant: State of Hawaii, HI
   Amount of Request: $1,220,000
   Total Project Cost: $1,220,000
   Purpose: To fund infrastructure development of the Hawaiian home lands. A total of 32,713 acres of these lands has been awarded as homestead lots through June 30, 1987. The proposed funds will assist the State of Hawaii to provide the roads, water, electricity and drainage improvements necessary to allow a substantial portion of the remaining acres to be leased to native Hawaiians. Not yet approved.
9. Applicant: New York, NY
   Amount of Request: $785,000
   Total Project Cost: $785,000
   Purpose: To fund the renovation of the building formerly known as the National Mariners Union Building, located at 17th Street and 9th Avenue in Manhattan and owned by Covenant House. The project fills a compelling and immediate need for crisis shelters for homeless youth.
10. Applicant: Burlington, VT
    Amount of Request: $60,000
    Total Project Cost: $20,335,000
    Purpose: To provide funds to assist in the operation of the Northgate Apartments. This project is tenant-owned and operated with 47 percent of the households involved qualifying as low income according to the definition set forth in HUD guidelines. The funds will leverage $20,000 in private donations from local churches and businesses and will be used to develop local capacity for the tenant management of the apartments. Not yet approved.
11. Applicant: Ada, OK
    Amount of Request: $500,000
    Total Project Cost: $500,000
    Purpose: To provide funds to undertake a downtown revitalization project.

Total of Approved Projects: $5,170,000
Balance Uncommitted: $4,080,000
Applications totaling $2,860,000 from Conference Report applicants are under review.

SENATOR MIKULSKI: The Department is proposing legislation that would enable communities to use CDBG funds for new construction. What is the advantage to allowing new construction?

Can you estimate how many communities would take advantage of this change? Would there be any coordination with the Housing programs?

ANSWER: Permitting grantees to use CDBG funds generally for new construction will allow communities to address, more directly, critical housing needs in high cost areas. At present, grantees may only provide assistance for new construction in limited situations usually through the use of nonprofit sponsors.

While we cannot, at this time, predict how many communities would take advantage of this change in the law, it would be safe to say at least a fourth of the entitled cities and urban counties would probably use this new provision. Based on prior patterns of practice, coordination with the Housing programs would occur as a matter of course.

ASSISTED HOUSING

Section 8 Certificates

SENATOR MIKULSKI: Notwithstanding the budget authority period, why doesn't HUD develop a budgeting formula that more accurately estimates total program costs in order to avoid potentially large program shortfalls or excesses?

ANSWER: The Department is continually pursuing better methods of estimating cost requirements of the Certificate program, as well as our other programs. Such changes as the 5-year term for certificates, provided in the 1989 Appropriations Act and the possibility of the Department merging the Voucher and Certificate programs, are the result of the continual reassessment of our cost estimating methodology. However, in projecting costs over 15 years, or even the current 5-year term, there are many economic changes that cannot be foreseen. For example, in 1976 when the costs of the certificates expiring in 1991 were calculated, the high inflation levels of the early 1980's could not be anticipated.

A GAO report has criticized our current system for not providing sufficient budget authority at the onset for the full-term of a Certificate unit, and has proposed an alternative formula for calculating full costs. There are certainly instances where shortfalls occur and this is the purpose of the amendment process. Both shortfalls and surpluses are the product of regional variations which are inherent in any methodology that attempts to institute one set of standards nationwide.

The substitute formual recommended by GAO, according to GAO, does not represent a statistical sample--it deals with only 70 of more than 2,000 PHAs. Their approach would be difficult to institute nationwide without the danger of over-funding a large number of PHAs. We feel that our current approach of amending shortfalls is more effective.

SENATOR MIKULSKI: Wouldn't a revised funding formula, such as the GAO has suggested, which is tied to actual costs, put the Congress in a better position to make informed decisions about assisted housing policies and funding levels?

ANSWER: The formula which the GAO recommended is inherently flawed. The data that the formula was based on did not reflect a valid statistical sample and therefore results could not be verified on an aggregated, national basis.

Further, regional and local variations in rents and incomes can have a significant impact on budget authority needs and it is questionable whether te GAO formual, on a national basis, would be able to accommodate those variations. The current amendment process provides the flexibility to deal with regional variations in those areas experiencing high than average rent increases without over-funding other areas. The GAO formula presents the possibility of over-funding.

The current HUD system for estimating costs is based on actual year costs. The actual year cost includes the tenant contribution, administrative fees and other reserves, and the subsidy on an aggregated basis.

The Department continually looks for better methods of estimating costs. Along with considering a merged voucher/certificate program, the Department is assessing various cost estimation alternatives.

ASSISTED HOUSING - SECTION 8 CERTIFICATES

SENATOR MIKULSKI: What is HUD's estimate of the funding shortfall for all current Section 8 rental certificate units?

ANSWER: The 1990 Budget reflects a request of $734.8 million in budget authority for fiscal year 1990 for amendments to Section 8 rental certificate units. The current amendment process allows the Department to resolve funding shortfalls on a PHA by PHA basis, as needed.

HUD PAYMENTS TO PUBLIC HOUSING AGENCIES TO ADMINISTER SECTION 8 CERTIFICATES

SENATOR MIKULSKI: Specifically, what administrative fee system is HUD planning to implement, and how will it work?

ANSWER: HUD is conducting an in-house study of the fee system used for reimbursing PHAs in the Certificate and Housing Voucher Programs. Our in-house study of fees will probably indicate that the current system is not over-reimbursing the majority of PHAs, particularly with the fee reductions (8.5 percent to 7.65 percent administrative fee and $275 to $250 preliminary fee) implemented in 1985.

While there is evidence that some large urban PHAs are over-reimbursed, there are also many PHAs that are actually losing money under the present system. Our proposed revision to the PHA fee system will probably not involve a drastic overhaul, and will try to distribute fees more equitably, paying more to PHAs operating in areas where wage costs are high relative to FMRs. We expect to propose a modification to the fee system within the next few months, although we anticipate that the overall cost of the system will be approximately the same as proposed in the 1990 budget. Our FY 1990 budget proposal provides for 7.65 percent administrative fee for both Certificates and Housing Vouchers.

SENATOR MIKULSKI: Since HUD annually receives, analyzes, and approves PHA financial statements containing administrative fee information, why doesn't HUD simply implement GAO's recommendation to annually assess and report to the Congress the actual cost of administering the program, rather than relying on a fee system?

ANSWER: We developed the formula approach to administrative fees as opposed to a cost reimbursement approach because of the advantages in promoting efficient program administration. The formula approach provides an incentive for PHAs to operate the program efficiently so that any savings accrued as a result of good management can contribute to other housing efforts. For example, excess fees have assisted financially troubled PHAs as well as reduced other program outlays. In effect, we are getting the most for our money by using the formula approach. A cost reimbursement approach does not offer any measurable way of promoting good administrative management. It is cumbersome to administer, requires more extensive auditing, and inflates project accounting data costs.

HOUSING VOUCHERS

SENATOR MIKULSKI: GAO conducted a study on the voucher program. GAO found that vouchers cost more than certificates because the voucher program provides additional benefits to tenants who rent below fair market rents.

Can HUD show that vouchers are less expensive than certificates without increases in voucher tenant rent burdens or changes in housing quality?

ANSWER: Vouchers are not less expensive than certificates--but they do offer more choice to low-income families while costing about the same as certificates.

Families who choose to rent below the locally determined payment standard are allowed to keep some of the savings, and this shift of income to the families makes vouchers more costly for the government in the short term. Over the longer term, if enough families find less expensive units, there will be less pressure on local agencies to raise the payment standards, and this will reduce costs for all participating families.

Families participating in the voucher program may rent housing that costs more than the payment standard if they are willing to pay the extra cost themselves. In this way they can have improved access to better housing and neighborhoods.

SENATE MIKULSKI: What is HUD's position on GAO's recommendation that the Secretary identify areas where fair market rents (FMR) may be either too high or too low and make necessary adjustments?

ANSWER: HUD recently responded to the conclusions concerning the FMRs in the GAO report in a letter from Secretary Kemp to the Chairmen of the Senate and House Committees on Government Operations. The accuracy of FMRs were based on anecdotal information obtained in only two market areas, Houston and Westchester County, New York. GAO did not survey or attempt to develop independent estimates of FMRs for these two areas or for any other areas. The Department, in fact, has statistically reliable data that subsequently became available that indicates that the FMR estimates for these two areas were accurate and that the GAO's implications that the FMRs were in error were the result of using seriously flawed information.

Because Westchester County officials believed its FMRs were too low, they hired a private company to conduct a survey using a Random

Digit Dialing telephone methodology we recommended. The resulting 45th percentile rent estimate was almost identical to the Department's FMR estimate. We recently received the results of the 1987 American Housing Survey (AHS) for the Houston area. This survey reported a 45th percentile rent within 5 percent of the FMR set by the Department.

We share GAO's concern to ensure that FMRs are as accurate as we can make them. HUD is considering ways of improving specific-area FMR estimates, and we are looking at options for improving our routine FMR estimation procedures. We are concluding the development of a Random Digit Dialing (RDD) telephone survey methodology that might be used to survey areas where FMRs are thought to be excessive or by PHAs in conjunction with their appeals of FMRs. Also, we are exploring ways to improve our data sources, including recent discussions with the Bureau of Labor Statistics to obtain better and more detailed data for making rent adjustments for local rental market areas.

SENATOR MIKULSKI: In identifying these areas, GAO suggested that the process of setting and adjusting FMRs include an analysis of data from HUD field offices on tenant rent burdens, utilization rates of vouchers and certificates, and available rental market studies. Have you considered these suggestions?

ANSWER: Yes, the Department has considered using data from the Field Offices as well as from PHAs, on tenant rent burdens, lease-up rates of voucher and certificate holders, and local market data. We agree that lease-up rates and rent burdens can be indications of FMR problems, and that these sources of information have the potential to be used to identify areas with such problems. However, we do not believe that this information by itself can be used to determine that the FMR is inappropriate. As an example, slow lease-up rates may be an indication of a tight rental market such as cited in the GAO report concerning New York City. In New York's case, the FMR is considered by HUD and by local sources to be a reasonable estimate of the 45th percentile rent, but there are so few vacancies that certificate holders are still having difficulty finding units. We would like to point out that the types of information referred to by GAO are frequently cited in the public comments as evidence of the need to modify the FMRs in a particular area. Although we look upon it as convincing evidence of FMR problems, we still require that the commenters provide rental survey data in addition to tell us what the correct 45th percentile estimate should be.

SENATOR MIKULSKI: GAO reported that fair market rents may be too high for in-place renters since HUD bases fair market rent computations on the higher rents of recent movers. Should HUD's calculations be revised to provide lower rents for "in-place renters"?

ANSWER: The Department recognizes that the rents of units that have turned over in the past 2 years are, on balance, about 5 percent higher than the rent level of the inventory. HUD decided, however, to base FMRs on a "recent mover" standard to facilitate the achievement of the basic legislative goals of the program to promote greater choice of rental housing amoung low-income families. Approximately half of the program participants do search for and move to other rental housing. The Department did, at one point, consider setting separate standards for "recent movers" and "in place" renters. This option was rejected because we felt is would be impossible to administer and would provide strong incentives for unnesceesary trading of units or other types of manipulation.

SENATOR MIKULSKI: Can HUD demonstrate that vouchers are influencing tenants to shop for less expensive housing?

ANSWER: The Voucher and Certificate Programs offer different incentives and restrictions in searching for housing and bargaining with landlords. For most voucher recipients, an extra dollar in rent means an extra dollar of out-of-pocket costs. For certificate recipients, an extra dollar in rent involves no extra out-of-pocket costs since tenants pay 30 percent of adjusted income regardless of the unit's rent or quality. Therefore, since certificate recipients cannot reduce their out-of-pocket costs by finding a less expensive unit, they have less reason to shop carefully for less expensive housing below the FMR ceiling.

Preliminary findings from the Freestanding Housing Voucher Demonstration indicate that in the lower range of quality but still meeting program quality standards, certificate recipients pay higher gross rents than voucher recipients for comparable housing. At higher quality ranges, the Certificate program's FMR ceiling forces certificate recipients to find lower priced units or forego the housing subsidy. By removing the FMR rent restriction, the Voucher program clearly allows some recipients to shift to more expensive units. As a result, the voucher recipients are somewhat more successful than certificate recipients in meeting program requirements and also end up with somewhat higher quality housing.

SENATOR MIKULSKI: If HUD converts expiring certificates to vouchers, would there be any special provision to have the payment standard lowered given that many existing certificate holders are renting below the established FMR?

ANSWER: It would be advantageous to retain responsibility for setting the payment standard with the local PHA. This provides an opportunity to "fine-tune" HUD's FMRs in a way that would not be possible if attempted from the national level.

HOUSING VOUCHERS

SENATOR MIKULSKI: If PHAs encounter shortfalls in voucher funding over a 5-year period, will HUD establish an adjustment pool as provided for in the Housing and Community Development Act of 1987?

ANSWER: We plan to publish a proposed rule for comment on the adjustment pool provision this winter.

SENATOR MIKULSKI: In budgeting voucher funds over a 5-year period, some PHAs are establishing reserves to cover potential future shortfalls by issuing fewer numbers of vouchers than HUD allocates to them. Does HUD believe that PHAs should serve fewer numbers of families than Congress authorizes?

ANSWER: HUD believes that PHAs should operate their programs in a manner that best addresses local needs. Based on local economic conditions, PHAs may decide it is necessary to set-up reserves to cover future shortfalls. This may result in increasing the housing assistance payment amount for families already on their program.

This is a "tradeoff" which often occurs during periods of scarce resources. It is a difficult one, but a decision the Department feels is best left to those closest to the situation--local PHAs. HUD's position that no supplemental funds would be available to cover shortfalls has made PHAs more fiscally responsible.

SENATOR MIKULSKI: How many fewer vouchers have been issued versus the number authorized since the voucher program was established?

ANSWER: Based on data included in Conference Reports on Appropriations Acts, it was expected that amounts appropriated through 1988 would support approximately 199,000 Vouchers. Through the end of FY 1988, a total of 181,767 voucher units had received reservations of funds. Based on last year's figures, we fully expect to "lose" no more than 10 percent of all units due to shrinkage. Shrinkage of units can be attributed to such factors as higher than average subsidy amounts to accommodate large families; higher than average payment standards due to tight housing markets; and the creation of reserves to cover future shortfalls.

SENATOR MIKULSKI: Does HUD believe that landlord rent increases that are greater than HUD's voucher budgeting forecasts should be absorbed by low-income tenants in the form of higher rent burdens?

ANSWER: HUD does not make forecasts of landlord rent increases. In providing funds to local PHAs, HUD uses a statutory formula that provides 115 percent of the estimated first-year subsidy cost for each year of the 5-year contract, plus administrative fees. The local PHA must prepare annual budgets, and determine when the payment standard should be raised to maintain affordability for participating families. If particular landlords are raising their rents by substantial margins, above market trends, the family will eventually move, just as in the private market. If the landlord's rent increases are consistent with trends in the local market, they will generally be covered by increases in the local payment standard, and the family will be able to absorb the rent increases without taking on higher rent burdens.

SENATOR MIKULSKI: a. Given the wide variation in housing markets across this country, some of which have few vacancies and virtually no available low-cost rental units, what is the Administration's rationale for relying almost entirely on housing vouchers? b. In fact, isn't the problem in some housing markets a lack of available low-cost housing rather than simply an affordability problem?

ANSWER: The Administration has not suggested relying entirely on vouchers, though this program is one vital component of HUD's initiatives for affordable housing. HUD is also reviewing the benefits of continuing the Low Income Housing Tax Credit (LIHTC) as a means to spur the building of new multifamily rental housing. The Secretary's major priorities include expanding opportunities for low-income homeownership, preservation of the existing housing stock, and rehabilitation of housing for the poor. The non-profit sector, as well as pension and insurance funds, can also play key roles.

The Secretary also understands that low vacancy rates can make it difficult for newly-married couples or even families trying to move into new housing to find affordable housing. This is especially true in rapidly growing market areas. However, when vacancy rates fall and competition for available rental units increases, this bids up rents and signals the private sector that more rental housing is needed. Of course, in rent-controlled markets, this process does not work as well because the signalling mechanism and the motivation for developing and owning rental property has been altered.

Except in rent controlled markets, the primary problem that low-income families face is that they do not have sufficient income to afford market-rent housing. The housing exists but it is not affordable many times because government regulations such as exclusive zoning, complicated building codes, and land use controls adds significantly to the cost. The Housing Voucher program addresses the problem directly and in a cost-effective manner. As such, we believe the Housing Voucher program directly alleviates some of the most urgent housing needs of low-income persons.

SENATOR MIKULSKI: Past allocations of housing program resources and proposals currently under consideration by the Congress require that these resources be allocated by formula based on certain housing market demographics. a. To what extent has HUD developed a reliable data base for evaluating housing needs among the several thousand housing markets in this country.

ANSWER: There are definite limits on HUD's ability to allocate resources by a formula that attempts to measure current demographic and housing market conditions. Neither the Census Bureau nor HUD tracks each housing market in the country, as suggested in the question. Information becomes available once every 10 years from the Census of population and housing. The American Housing Survey makes supplementary information available for 44 selected large metropolitan areas approximately every 3 to 5 years. Much more limited information such as vacancy rates and rents are available on a fairly current basis for a larger number of metropolitan areas. Virtually no information is available between the decennial censuses for the individual nonmetropolitan markets.

What this suggests is that formula allocations should not attempt to measure current market conditions. Instead, formula allocations should seek to achieve broad equity, relying instead on State and local governments and on HUD Field staff to make sure that the funds are used where most needed.

b. What housing data is being dropped from the 1990 Census and how might this impact future targeting/allocations of housing resources?

ANSWER: Five of the housing questions that had been on the 1980 Census have been dropped from the 1990 Census. In response to OMB's request to carefully evaluate our needs for data against the burdens and costs of additional questions, we had reluctantly agreed to drop questions on presence of elevators and of air conditioning and on number of units at addresses as less important than the remaining questions on housing cost and housing quality. However, over our objections, the question about the presence and type of heating equipment was omitted from the Census, and the question about complete plumbing will be asked on the "long form" sample only.

Although neither of these questions is used specifically in allocating Federal funds, their omission seriously weakens the Census' already imperfect measures of housing quality, and lack of these data is likely to undermine local efforts to effectively and efficiently target funds at housing in need of rehabilitation. The plumbing question in particular had been the only question providing a long-recognized measure of housing quality for areas smaller than

Census tracts. It had been asked in every decennial Census since 1940, and provided historical continuity in measuring changes in housing quality over time, particularly in remaining pockets of poverty.

LOSS OF LOW INCOME HOUSING

SENATOR MIKULSKI: What has been HUD's experience to date on: (1) the loss of low income housing from the 1.9 million units that are privately owned but federally subsidized and (2) what steps has HUD taken to implement the incentive provisions of the Housing and Community Development tax of 1987 and what has been the Department's experience?

ANSWER: (1) To date, HUD has received 20 Plans of Action from owners of privately owned, federally subsidized housing. Eighteen of these request incentives to extend the low income affordability restrictions through the term of the mortgage, and 2 request restrictions. HUD has approved only 1 Plan of Action so far.

(2) HUD has implemented the incentives provision of the Housing and Community Development Act of 1987 through the promulgation of regulations (effective May 20, 1988) and program and administrative guidance (issued and effective May 20, 1988, July 14, 1988, and October 14, 1988) to HUD Field Offices and eligible project owners and managers.

Incentives the Department has to offer owners to extend the low-income affordability restrictions consist of:

a) Section 241(f) equity "take-out" loans;
b) Flexible Subsidy and Capital Improvement Loans;
c) Recalculation of equity and allowable distributions;
d) Rent increases; and
e) Section 8 Loan Management Set-Aside assistance.

The Capital Improvement Loan Program, authorized by Section 185 of the 1987 Act, amends the Flexible Subsidy Program and provides for amortized, low-interest loans to finance the replacement of major capital components of a building. This new program, as mandated in the McKinney Amendments, was implemented by regulation on March 7, 1989.

EVICTIONS

SENATOR MIKULSKI: The Housing and Urban-Rural Recovery Act of 1983 (now Section 6k of the Housing Act of 1937, as amended) allowed PHAs to by-pass grievance procedures and go directly to court in all cases involving "an eviction or termination of tenancy" in any jurisdiction where the HUD Secretary finds that the tenant will get a due process hearing. It is now six years later and HUD has not yet certified to PHAs (except in Virginia) in which states they can skip the grievance and go straight to court. Given the urgency of removing drug violators, among other things, why has HUD failed to make these certifications?

ANSWER: HUD has issued due process determinations for eviction procedures in 29 States and the District of Columbia. All of these determinations were issued before the passage of Section 404 which will require new due process determinations for drug related evictions for all jurisdictions. Provision 404 severely limits the affect and utility of due process determinations. Section 404 will essentially force local housing authorities to provide administrative hearings for eviction of drug criminals, even if these hearings duplicate and delay due process eviction procedures in State landlord and tenant courts (except where HUD issued a due process determination before enactment of Section 404).

HUD is seeking a repeal of Provision 404 because its enactment is a significant set-back to our efforts to establish drug-free public housing and a drug-free America, at a time when residents, law enforcement officials, the Administration and the Congress are calling for tough action. In the absence of an repeal HUD will be required within the next 6 months to solicit tenant comments before issuing any additional due process determinations covering evictions for drug-related criminal activity.

SENATOR MIKULSKI: When will it do so for all eligible PHAs? Is there any any reason why these certifications can't be made by HUD on its own initiative, without requiring individual requests from the 3200 PHAs?

ANSWER: On May 16, 1989 the Secretary instructed HUD's Regional and Field Counsels to evaluate the eviction laws in each of the States to determine if they provide for due process. When we were making due process determinations through a systematic analysis of laws in each State, the findings applied to all PHAs in the State. There were additional States for which HUD was unable to find that due process was fully afforded as currently defined by HUD regulations. A list of those States where HUD has issued due process determinations prior to Provision 404 follows.

California	6/29/89
Colorado	6/30/89
Connecticut	6/28/89
District of Columbia	5/15/89 (first determination); received 6/30/89
Florida	6/29/89
Georgia	6/23/89
Idaho	6/30/89
Illinois	6/30/89
Iowa	6/29/89
Louisiana	6/28/89
Maryland	6/29/89
Massachusetts	4/19/89 (Boston); 6/23/89 (Statewide)
Minnesota	6/29/89
Mississippi	6/27/89
Missouri	6/29/89
Montana	6/29/89
New Hampshire	6/23/89
New Jersey	6/15/89
New York	5/23/89
North Dakota	6/29/89
Ohio	6/30/89
Pennsylvania	6/29/89
Rhode Island	6/23/89
South Carolina	6/29/89
South Dakota	6/29/89

Tennessee	6/23/89
Vermont	6/28/89
Virginia	4/05/89 (Alexandria); 6/30/89 (Statewide)
Washington (State)	6/29/89
Wyoming	6/29/89

PUBLIC AND INDIAN HOUSING MODERNIZATION

SENATOR MIKULSKI: Isn't this level of funding woefully inadequate and won't it lead to a further deterioration in our public housing stock?

ANSWER: The Department provided $1.7 billion of new funding in 1988 and will provide an additional $1.6 billion in 1989. At the end of 1988, a total of $3.2 billion was unobligated by Public Housing Agencies (PHAs) and Indian Housing Authorities (IHAs), including $1.7 billion funded at the end of 1988. Therefore, the Budget requests $1 billion for 1990 so as not to exceed the PHAs'/IHAs' capacity to obligate and expend previously approved modernization funds.

VACANCY RATES

SENATOR MIKULSKI: What's the current vacancy level in public housing? How many PHAs have vacancies greater than 15 percent?

ANSWER: As of September 30, 1988, there were approximately 79,000 vacant Public Housing units out of a total of 1,309,946 Public Housing Agency-owned units under management which is about 6 percent of the total.

Of the Public Housing Agencies (PHAs) that submitted data for calendar year 1988 applicable to the conventional Public Housing program, 306 had vacancy rates greater than 15 percent. A distribution of this number by size category is shown below:

SIZE CATEGORY	PHAs	PHAs WITH VACANCY RATES ABOVE 15%	AS PERCENT OF SIZE CATEGORY
Large (1,250 or more units)	141	21	15%
Medium (500-1,249 units)...	237	24	10%
Small (100-499 units)......	1,273	83	7%
Very Small (1-99 units)....	1,586	178	11%
Total....................	3,237	306	9%

SENATOR MIKULSKI: How many does HUD expect to lose operating subsidy under their comprehensive occupancy plans?

ANSWER: The Department does not have data that indicate how many PHAs are not able to meet the occupancy goals of their HUD-approved Comprehensive Occupancy Plans. Under certain circumstances, however, a PHA may be able to adjust its occupancy goal downwards.

SENATOR MIKULSKI: What research is in progress or planned on vacancies? Related to Modernization?

ANSWER: The Department is in the midst of evaluating studies dealing with modernization needs completed by Abt Associates and ICF, Inc., but is not conducting any research related to Public Housing vacancies or their impact on modernization.

ALTERNATIVES TO PUBLIC HOUSING MODERNIZATION

SENATOR MIKULSKI: Aside from federal funding, what financing options does HUD see available for meeting the modernization needs in public housing today?

ANSWER: The Department believes that there are other options for supplementing Federal funding for modernization. These options include leveraging State and local funds (as proposed in the Budget) and providing tax credits to private developers who will rehabilitate Public Housing. Private capital for energy conservation can be made available under Section 118 of the Housing and Community Development Act of 1987.

PUBLIC HOUSING VACANCIES

SENATOR MIKULSKI: What has been HUD's experience with vacancy rates in public housing, particularly urban family projects, and are not certain increases in vacancies directly attributable to an erosion in the physical condition of our public housing stock?

ANSWER: Estimated Public Housing vacancies are averaging about 6 percent based on the latest data available from a 1985 sample of PHA-owned units. Past studies have shown that a significant number of vacancies are attributable to units undergoing substantial modernization. Other causes of vacancies include management problems at PHAs, oversupply of certain types of units, vandalism, and lack of market.

PUBLIC AND INDIAN HOUSING MODERNIZATION REPLACEMENT FUNDS

SENATOR MIKULSKI: Congress expected that the modernization program, as it exists today, would be phased out over time and a replacement reserve would be established to meet future modernization needs. What steps has HUD taken to establish replacement reserves?

ANSWER: Section 14 of the U.S. Housing Act of 1937, as amended by the Housing and Community Development Act of 1980, established the Comprehensive Improvement Assistance Program (CIAP). Although a replacement reserve was authorized by Section 14, it was never funded. Given the high level of existing needs, it would be difficult to set-aside a portion of appropriated funds to meet future reserve replacement needs.

SENATOR MIKULSKI: Given the enormous unmet modernization needs, is it realistic that replacement reserves can be adequately funded in this time of budget austerity?

ANSWER: When the Department makes its recommendation for the new Comprehensive Grant formula, the proposal will include a statement of the proportion of each year's funds that is based on future capital improvement needs and the extent to which it is based on backlog needs.

SENATOR MIKULSKI: At a meeting of the Research Advisory Group (RAG) of March 31, it was said that the final report on the "Future Accrual of Capital Repair and Replacement Needs of Public Housing" would be forwarded to Congress soon. When can we expect to see this study?

ANSWER: The report was delivered to the Congress on May 23, 1989.

SENATOR MIKULSKI: Have any findings of this study been reflected in HUD's budget request?

ANSWER: HUD's 1990 Budget request does not reflect any of the findings of the study.

SENATOR MIKULSKI: We understand that this report shows that it would cost a total of $2.7 billion per year just to "keep up" with normal deterioration of public housing and that this would not actually reduce the backlog or address problems of removing lead paint and other toxins. In light of this, how can you justify a budget request of only $1 billion?

ANSWER: The most recent report from that study, Future Accrual of Capital Repair and Replacement Needs of Public Housing (April 1989), estimated that the current backlog of modernization needs range from $12 to $22 billion and estimated on-going capital accrual needs of approximately $1.5 to $2 billion. The Department is aware that the 1990 request of $1 billion is inadequate to meet the identified modernization needs of public housing. We are presently analyzing the policy implications of the two reports from the Modernization Needs Study (the Backlog Report issued in April 1988 and the Accrual Report issued in May 1989) and will be considering a number of options for addressing the implications of these reports. Given the tight fiscal constraints on the Federal budget, we wish to re-assess in a very deliberate manner the most responsible approach to the large modernization needs of public housing.

SENATOR MIKULSKI: Won't the condition in the public housing only get worse at this level of funding?

ANSWER: Yes. We look forward to examining a number of options for meeting the repair needs of public housing within the general context of overall Federal housing policy in the coming months.

SENATOR MIKULSKI: How do you plan to use the database in the study to develop a realistic cost estimate plan for removing lead in public housing as the Congress has required?

ANSWER: The database of the Modernization Needs Study will be superseded by data currently being gathered as part of the lead-based paint demonstration and survey mandated by Section 566 of the Housing and Community Development Act of 1987 and Section 1088 of the Stewart B. McKinney Homeless Assistance Act, 1988. This current research initiative is assessing the most efficient and effective testing and abatement techniques and their associated costs; surveying the incidence of lead-based paint in housing in the U.S. (including public housing); and, developing a set of options and their costs for abating the estimated hazard.

SENATOR MIKULSKI: How much additional money will be required to carry forward a joint effort among HUD's Offices of PD&R and Public Housing and the PHAs?

ANSWER: The amount of funds which will be needed to abate lead-based paint hazards in public housing is not known at this time. The current studies being conducted under the direction of the Office of PD&R, will address this question.

LEAD-BASED PAINT

SENATOR MIKULSKI: The PHA's Research Advisory Group study seems like a useful document. Shouldn't this model be followed in adapting the NIBS handbook to the modernization program?

ANSWER: The Department currently is preparing a "Crosswalk" between the National Institute for Building Sciences (NIBS) lead-based paint guidelines and the CIAP Handbook for use by Public Housing Agencies (PHAs) and Indian Housing Authorities (IHAs) undertaking modernization. The Department is working closely with the National Association of Housing and Redevelopment Officials (NAHRO), Council of Large Public Housing Authorities (CLPHA), Public Housing Authorities Directors Association (PHADA), several representative PHAs, and a number of experts in developing this document. HUD believes this approach will result in a quality document responsive to PHA/IHA needs.

SENATOR MIKULSKI: We would like to see other results from the study. Specifically, analyses on redesign, energy conservation, handicapped access, Indian modernization needs, and data base accessibility to others. When will these be available?

ANSWER: In addition to the two reports which have already been issued (which covered all of these topics), two more reports are scheduled to be released from the Modernization Needs Study--the Analysis Report and the CIAP Report. The Analysis Report will provide a detailed description and analysis of the modernization needs of public housing. It will describe the types of repairs and replacements most often needed and relate these as well as the total repair needs to the characteristics of the projects. That report should be available in the fall of 1989. The CIAP report will describe the results of questionnaires administered to HUD Field offices, PHAs, and project managers on their experience with the CIAP program. That report is expected to be available in late fall. An annotated database for use by non-HUD users will be available in the fall of 1989. Study results on redesign, energy conservation, handicapped access, and Indian modernization needs were included in the two reports already issued. Separate reports on these topics were never intended to be issued. Because of the request of the Research Advisory Group (RAG) we are examining the Redesign information to determine the advisability of further analysis and possible production of a separate redesign report.

MODERNIZATION NEEDS STUDY

SENATOR MIKULSKI: Aside from the pure dollar numbers, how else does HUD plan to use the study to improve its own administration of the Modernization program?

ANSWER: There is a component of the study which the Department's Office of Policy Development and Research (PD&R) is now analyzing that relates to CIAP administration and PHA perception of the program. The Department will use the results of that analysis to make further improvements in the administration of CIAP.

SENATOR MIKULSKI: Has HUD gained other knowledge as a result of the study?

ANSWER: The study has been used in developing alternative formula approaches to the funding of modernization. Further work with the information of the study is proceeding and we anticipate that it will yield further insight into the best approaches to meeting the modernization needs of Public Housing.

SENATOR MIKULSKI: Have you reviewed your allocation procedures and priorities in light of these needs?

ANSWER: The Department has reviewed the allocation procedures and priorities with respect to needs. For example, in fiscal year 1989, greater emphasis was placed on the adequacy of the PHAs' routine, nonroutine and preventive maintenance systems to ensure that projects are maintained properly after modernization. The Department also stressed the importance of PHAs' funding requests being consistent with their Comprehensive Plans for Modernization (CPM). The CPM is a required master plan of the total physical and management improvement needs of a PHA's entire stock for those PHAs with over 500 units. In addition, the Department continued to emphasize PHA modernization and management capability as prerequisites for funding. Also, the assignment of funds to the Regional Offices for fiscal year 1989 reflected the relative need as it was presented in the Abt study.

Section 119 of the Housing and Community Development Act requires the Department to "submit to the Congress proposed methods for determining the relative allocation of funds between activities to correct existing deficiencies and the annual accrual of resources to meet future needs." This allocation method currently is being developed and the Department plans to submit it to Congress in the Fall of 1989.

SENATOR MIKULSKI: Section 119 of the 1987 Housing and Community Development Act requires HUD to submit to Congress no later than February 5, 1989 proposed methods for allocating funds among PHAs to modernization, including formulas for distributing funds at the HUD regional and field office levels, state levels and to PHAs. When will that report be submitted and what will it propose in terms of allocations and funding needs?

ANSWER: The report to Congress on Alternative Methods of Funding Public Housing Modernization, required by Section 119(f) of the HCD Act of 1987, is expected to be completed and transmitted to Congress in the fall. A first draft of the report has been completed and reviewed by representatives of PHAs and State and local governments, who presented their views at a meeting to discuss the alternative funding approaches set forth in the draft on June 27, 1989. A similar meeting is planned following HUD revisions to the report to reflect the discussion at the June 27 meeting. These meetings are part of the consultative process required by Section 119(f). The Department has not yet developed recommendations with respect to the most appropriate funding mechanism for the modernization program, or the desirable funding levels for modernization, nor has it determined the most appropriate method to transmit its recommendations to the Congress.

SENATOR MIKULSKI: Are there categories of "needed" items in particular that HUD has not been funding or has underfunded?

ANSWER: Lead-based paint testing and abatement costs and costs to meet physical accessibility requirements are two areas that have not been funded adequately in the past. Since these areas reflect recently revised requirements, they are not counted adequately in the Abt study.

MODERNIZATION FUND MATCHING BY STATES

SENATOR MIKULSKI: HUD proposes in its FY 90 Budget that one quarter of the Comprehensive Improvement Assistance Program (CIAP) funding be awarded on the basis of a set-aside for PHAs which can attract matching State funds. Is HUD still planning to pursue this plan?

ANSWER: Yes, if the Congress agrees with such a set-aside, the Department will implement it.

SENATOR MIKULSKI: Do you have commitments from any States?

ANSWER: To date, no commitments have been received from any States.

MODERNIZATION

SENATOR MIKULSKI: The 1987 Housing and Community Development Act required you to produce a number of studies on alternative methods for improving the distribution of modernization funds by February 7 (now section 14(k)(1) of the Housing Act of 1937.) a. Have you completed these studies? b. Have you awarded contracts for them? c? If so, to whom? When will they be completed?

ANSWER: The Housing and Community Development Act of 1987, enacted February 5, 1988, authorized major changes to the Comprehensive Improvement Assistance Program (CIAP) for public housing modernization as it applies to Public Housing Agencies (PHAs) which own or operate 500 or more public housing units. However, the statute provides that the method for allocating modernization funds should remain substantially the same as it was in the past until the Congress enacts a method for allocating assistance under the revised CIAP program. Section 119(f) of the 1987 Act requires the Department of Housing and Urban Development (HUD) to submit a report to Congress outlining alternative methods for providing funds to PHAs under the revised program to assist the Congress in making decisions about the most appropriate approach to funding public housing modernization.

This report is being prepared by staff of HUD's Office of Policy Development and Research, using data available from the Modernization Needs study. A first draft of the report has been prepared. The report is expected to be completed by the fall of 1989.

SENATOR MIKULSKI: Have you held quarterly consultations with housing authority organizations and the other groups as called for by the Act?

ANSWER: A meeting was held on January 31, 1989, with representatives of PHAs, tenants, and State and local governments to begin the consultation process required by the Act. This meeting focused on the outline of the report, to ensure that all areas of interest to meeting participants would be addressed in the report. A second meeting occurred June 27 to present participants with the opportunity to give their views on the draft of the report, and to discuss alternative methods of funding modernization.

TOTAL OPERATING SUBSIDY NEEDS

SENATOR MIKULSKI: Operating subsidies are proposed to be funded in FY 90 -- by the projections of some groups -- at only 97.3% of PFS eligibility. Why, when HUD is aware of the longstanding congressional intent that PFS be funded at 100%, is HUD seeking a reduced appropriation?

ANSWER: HUD is not seeking a reduced appropriation. Based on the current calculation of Operating Subsidy needs, the Budget estimate of $1,694.2 million will fund requirements at 100 percent for 1990. This calculation is based primarily on the Performance Funding System (PFS) formula. The total also includes funding for additional insurance costs, for energy incentives as required by the 1987 Housing and Community Development Act, and for a formal review of the Allowable Expense Level.

FUNDING SECURITY AND DRUG PREVENTION ACTIVITIES

SENATOR MIKULSKI: How can HUD be so concerned about crime and drugs and still cut operating money for security for Public Housing? What is really needed in the way of funding for crime and drug efforts in Public Housing?

ANSWER: HUD is not cutting operating funds for Public Housing security. The Department will use the $79.8 million included in the 1989 Supplemental Appropriations Act to permit operating subsidies to be provided to Public Housing Agencies (PHAs) and Indian Housing Authorities (IHAs) at 100 percent of Performance Funding System (PFS) requirements. In addition, $8.2 million are included in the Supplemental Appropriation to initially fund more intensive activities to make Public and Indian Housing projects drug-free.

Because the needs of each PHA/IHA vary widely with regard to project security and drug abatement, no estimate of total costs is available. Approximately $80 million currently are being spent annually on security by PHAs/IHAs from Operating Subsidy funds. Expenses in this category include police, guards, alarm systems, communications equipment, vehicles, and contracts with tenant organizations involved with security. The Department believes it is reasonable to assume that a very substantial portion of these funds is used specifically for dealing with the drug problem. Also, the Department anticipates that there will be significantly increased expenditures under the Comprehensive Improvement Assistance Program (CIAP) for anti-drug related programs, particularly as a result of the Notice the Department issued on April 4, 1989 providing for greater consideration to PHAs/IHAs seeking to increase or initiate drug elimination activities under CIAP. Also, anti-drug activity is an eligible expenditure under the Community Development Block Grant program. Through both these and local sources of funds, HUD expects PHA/IHAs to get the funds they need to eliminate drug activity at PHA/IHA properties.

OPERATING SUBSIDIES

SENATOR MIKULSKI: How do you plan to implement the appeals process? When?

ANSWER: The Department plans to implement the appeals process through publication of changes to 24 CFR Part 990, the Performance Funding System. A proposed rule will be published shortly. Under the Administrative Procedures Act, the public will have a right to participate in this rulemaking by commenting on the proposed rule. All comments received on the proposed rule will be considered before a final rule is published. Once the final rule is published and becomes effective, the Department will be in a position to initiate the formal review process in fiscal year 1990.

SENATOR MIKULSKI: What criteria do you propose to consider for approval of appeals?

ANSWER: The Department proposes to apply a new formula to recent circumstances of a Public Housing Agency (PHA) or an Indian Housing Authority (IHA) to determine in an equitable way whether a PHA's/IHA's Allowable Expense Level needs to be adjusted in accordance with the dictates of Section 118(a)(2) of the Housing and Community Development Act of 1987. The new formula proposes to use the following factors:

--measures of community distress (and need) such as the community's per capita value of the Community Development Block Grant program's Formula B (each of which would be multiplied by the proportion of a PHA's/IHA's units containing two or more bedrooms);

--measures of area costs such as the community's index of local government wage rates and the median rent in the community; and

--measures of a PHA's/IHA's operating characteristics such as the weighted average of a PHA's/IHA's buildings (multiplied by the proportion of its units containing two or more bedrooms) and the total number of a PHA's/IHA's units containing two or more bedrooms.

SENATOR MIKULSKI: Despite recognition in the budget of additional costs for insurance and allowable expense level appeals, as in last year's budget, HUD has again requested a reduction in operating subsidy needs of $40 million due to "improved tenant income" as a result of increases in rental collections through improved certification/recertification procedures. What was the basis for the original savings estimate?

ANSWER: The savings estimate is based on potential savings contained in a report issued by the HUD Inspector General.

SENATOR MIKULSKI: Was the $40 million projected for FY 89 achieved, and if not, please give us the status of FY 89 tenant rental collections?

ANSWER: The $40 million projected for fiscal year 1989 will not be achieved and it currently is estimated that local income will be $1,917.6 million for fiscal year 1989.

SENATOR MIKULSKI: Why have you used the same estimate for the coming fiscal year?

ANSWER: The 1990 estimate is based on the same assumptions as used in previous years; that is, anticipated increased rental income collections resulting from an improved program of income recertification and income matching by PHAs/IHAs in accordance with the Housing and Community Development Act of 1987. However, since the data collection system which will provide the needed information about resident income is not yet operating, there is neither the data base nor the experience on which to base the estimates. Therefore, the estimates continue to be based on the Inspector General report which is the only applicable source of information that is available.

SENATOR MIKULSKI: Has HUD done any budget calculations for PHA operations considering the $125 million necessary to repay PHAs for illegal retroactive recaptures in operating subsidies which are the subject of two pending lawsuits against HUD, Committee for Fairness v. Pierce and NAHRO et al v. Pierce?

ANSWER: HUD has not requested funds for this purpose in any Budget. In 1984, HUD initiated recaptures from PHAs and IHAs of operating subsidy overpayments which resulted from under statements by the PHAs and IHAs of estimates of locally generated income (principally on investments and "other" income). In 1986, HUD reached a settlement of $13 million with The Council of Large Public Housing Authorities (CLPHA) and 22 PHAs which had instituted a lawsuit to block the recaptures. During 1987, the Department entered into an agreement with the National Association of Housing and Redevelopment Officials (NAHRO) and the Public Housing Authorities Directors Association (PHADA) under which over 800 PHAs and IHAs have signed releases providing for the reimbursement of approximately $39 million previously recaptured, subject to the availability of funds. Under the agreement, HUD is not required to request additional funds for this purpose. The agreement expires at the end of fiscal year 1989. However, the agreement provides that if at least two-thirds of the funds were not paid by the end of fiscal year 1988, PHAs and IHAs could opt out of the agreement. In separate litigation, 44 PHAs, constituting the "Committee for Fairness" are seeking injunctive relief from further recaptures and reimbursement of amounts previously recaptured.

PUBLIC HOUSING DEVELOPMENT REQUEST

SENATOR MIKULSKI: During the last eight years only about 5,000 units of public housing per year were added to the stock, down from almost 30,000 units annually in the late seventies. The HUD Budget, once again, recommends no funding for public housing development for FY 90. An investment of $700 million in FY 90 would translate into 10,000 units, many of which would serve as replacement units. Why shouldn't we appropriate that level?

ANSWER: No additional funding is proposed for Public Housing development in 1990 because low-income family housing needs can be served using the Housing Voucher program. This program is more efficient and less costly than the Public Housing program.

PUBLIC HOUSING REPLACEMENT/RELOCATION ASSISTANCE

SENATOR MIKULSKI: How much money is needed for replacement units for projects undergoing major redevelopment?

ANSWER: No funding is requested for Public Housing units to replace existing housing undergoing major redevelopment. However, the Budget reflects the use of 333 Section 8 Certificates (15-year term) for 1989 and 1990, respectively, to replace Public Housing units that have been demolished/disposed. In addition, the Budget also reflects the use of 1,500 Section 8 Vouchers in 1990 as relocation housing for families affected by demolition or disposal of Public Housing units.

SENATOR MIKULSKI: Is HUD asking for it? Is this really enough?

ANSWER: Funding is being requested for these Section 8 units in the 1990 Budget and if the legislative changes being proposed to the "preservation" legislation are enacted, it is expected to be adequate for this purpose.

SENATOR MIKULSKI: How many public housing units do you expect to be demolished or disposed of in FY 89, FY 90 and FY 91?
ANSWER: The 1990 Budget assumes that 3,200 Public Housing units will be approved for demolition/disposition each year.

SENATOR MIKULSKI: Will you seek appropriations for the statutorily required one-for-one replacement units to cover these losses?
ANSWER: The 1990 Budget assumes that, where necessary, units demolished/disposed will be replaced by either 15-year Section 8 Certificates or by comparable 15-year State or locally funded units as specified in Section 121 of the 1987 Housing and Community Development Act. Since units to be demolished are almost always vacant, HUD is seeking legislative relief from the one-for-one replacement rule.

SENATOR MIKULSKI: How many replacements by public housing units?
ANSWER: No funding has been requested in the Budget for additional Public Housing units for 1990.

SENATOR MIKULSKI: How many by section 8 mod rehab?
ANSWER: The 1990 Budget does not anticipate the use of any Section 8 Moderate Rehabilitation units to be used to replace Public Housing units.

LEAD-BASED PAINT COSTS

SENATOR MIKULSKI: The HUD budget contains no add-ons for lead-based paint abatement mandated in the Housing and Community Development Act of 1987 to be completed in public housing by 1992. Some industry groups have recommended an add-on to modernization funding for FY 90 of $500 million for lead abatement.

In light of the recent Abt study's concession of the huge amount of money required for modernization of public housing and the enormous preliminary estimates of the cost of abatement, on what basis has HUD determined that basic CIAP funding can support testing and abatement in public housing?
ANSWER: The amount of funds needed to accomplish complete lead-based paint testing, abatement, clean-up and disposal nationwide depends on the protocols developed in the revised HUD guidelines and information on the extent of lead-based paint in pre-1978 Public and Indian Housing projects. Therefore, the Department cannot now make an estimate of the funds needed, but will determine needs once the revised HUD guidelines and the Department's abatement demonstration and national survey of lead-based paint hazards are completed.

SENATOR MIKULSKI: The lead-based paint demonstration mandated to be performed by HUD in the Housing and Community Development Act of 1987 is slated for completion by December 1989, only 8 months from now.

a. Are any preliminary reports of the portions of the demonstration related to public housing available for release to the Congress? b. Will the study be completed on time or do you anticipate requesting an extension?

ANSWER: a. The public housing portion of the demonstration is currently being planned. The Department has had difficulty in identifying appropriate PHAs interested in participating in the demonstration. No reports will be available for several months. b. The Department is currently reviewing the statutory reporting deadlines and expects to submit a request regarding extensions to the Committee in the near future.

SENATOR MIKULSKI: What was the basis for selection of PHAs to participate in the demonstration? What public housing authorities have actually been selected? Do those PHAs selected provide a sufficient data base for projecting costs, evaluating abatement methodologies, etc., universally in public housing?

ANSWER: In order to be selected for participation in the public housing component of the demonstration, the PHAs must possess units with following characteristics:

- row-house, garden type, or multifamily structures containing interior corridors (the demonstration should reflect a mix of these units);
- lead-based paint;
- scheduled for comprehensive modernization with work to begin in the summer or fall of 1989; and
- cooperative PHA contractors willing to accept change orders on their existing contracts.

In order to complete the demonstration on a expedited basis, the Department must work with CIAP projects already planned and scheduled. To start before the architectural and engineering contract is selected would add a year to this process. Participation by the PHA is voluntary.

Only one PHA has been tentatively selected--Omaha.

The research design will ensure that the units selected and data generated regarding cost, efficiency of abatement methodologies and related issues will allow for generalization to other public housing units.

SENATOR MIKULSKI: What is the progress of the public housing portion of the demonstration? Please describe the coordination between the Office of Policy Development and Research and the Office of Public Housing in designing and executing the demonstration.

ANSWER: The Department has had some difficulty in identifying appropriate PHAs interested in participating. At this point, HUD has not been able to identify a PHA with units in multifamily structures that fulfill the other criteria as well. Units are needed in buildings with interior corridors to measure the spread of lead dust during abatement. HUD expects to complete the selection of the demonstration units in the near future.

PD&R has worked closely with the Office of Public and Indian Housing (PIH) regarding the design and execution of the demonstration and the identification of appropriate PHAs for participation in the demonstration. The Office of Public Housing has participated with PD&R in the selection of the demonstration support contractor and will assist PD&R in selecting the contractor to prepare the National Hazards Estimate and the Comprehensive and Workable Plan. PIH also participates in briefings related to the progress of other lead-based paint contracts.

LEAD-BASED PAINT GUIDELINES

SENATOR MIKULSKI: When do you plan to release the guidelines submitted by the National Institute of Building Sciences? Has HUD or will HUD perform any independent evaluation of the guidelines?

ANSWER: The Department is reviewing the lead-based paint guidelines that were prepared by the National Institute of Building Sciences (NIBS). The Department sent out copies of the guidelines for review and comment prior to a meeting on May 12, 1989 with representatives from the Congress, Public Housing organizations, other Federal agencies and health organizations. At that meeting, many of the representatives raised serious concerns about releasing the document as it currently is written. Many of the concerns raised both at the meeting and in subsequent comments and discussions are reflected in the minority opinions. Consequently, the Department has decided to revise the guidelines and plans to release the HUD revision before the end of this fiscal year.

SENATOR MIKULSKI: Will HUD integrate protocols from the NIBS guidelines into the demonstration?

ANSWER: Yes. The Department intends to incorporate the complete set of protocols on testing, abatement, worker safety, clean-up and disposal into the Department's PD&R demonstration.

SENATOR MIKULSKI: What, if any, shortcomings do you see with the NIBS guidelines?

ANSWER: The NIBS guidelines represent a significant step forward for the Department and all those concerned with preventing lead-based paint poisoning. However, the guidelines have some shortcomings. First, the protocols are extremely detailed and costly inasmuch as the guidelines are based upon the most conservative testing, abatement, worker safety, clean-up and disposal techniques and procedures. If Public Housing Agencies and Indian Housing Authorities are required to implement these protocols as currently written, fewer units will be abated and a large number of children under 7 years of age and pregnant women will remain at risk for an extended period of time. Second, the guidelines as currently written, do not integrate the protocols into the Comprehensive Improvement Assistance Program (CIAP) procedures. Since most of the testing and abatement will occur during modernization of Public Housing, the integration of the lead-based paint guidelines with CIAP is essential. The Department currently is preparing a "Crosswalk" between the NIBS Guidelines and CIAP which is expected to be available in fiscal year 1990.

SENATOR MIKULSKI: What steps has HUD taken to date to examine the feasibility of PHAs and their contractors and consultants acquiring liability insurance for hazards related to lead abatement?

ANSWER: The Public Housing Agencies (PHAs) and Indian Housing Authorities (IHAs) and the contractors purchase liability insurance on an individual basis. A great majority of the insurance policies contain the common industry practice of excluding coverage for lead poisoning. Therefore, it is doubtful that individual PHAs/IHAs would be successful in obtaining limited coverage for lead hazards from their current insurer at an affordable cost.

Consequently, the Department has studied two options. One option would be for PHAs/IHAs to purchase a "national" or "master" insurance policy to provide insurance coverage for the abatement/-

removal of lead-based paint. However, that option is not considered to be feasible because coverage either would not extend to the abatement/removal contractors or the cost would be prohibitive. The other option which currently is being considered by the Secretary would be for the Department to indemnify PHAs/IHAs and the contractors for tort claims resulting from the lead-based paint abatement/removal process.

SENATOR MIKULSKI: Since universal abatement in public housing was mandated in a statute which took effect over a year ago, how is the delay justified?

ANSWER: On August 15, 1988, the Department executed a contract with the National Institute of Building Sciences (NIBS) to develop a consensus-based document providing guidelines for the testing, abatement, clean-up, and disposal of lead-based paint in Public and Indian Housing projects. The final report was provided to HUD on March 15, 1989. HUD interim guidelines will be issued by September 30, 1989.

SENATOR MIKULSKI: Have you been working with other agencies, such as EPA and NIST, in addressing the issue of lead paint abatement?

ANSWER: The Department entered into a Memorandum of Understanding on lead-based paint with the Environmental Protection Agency in April 1989 and is receiving substantial technical assistance through regular consultation. The National Institute of Standards and Technology is performing an evaluation of lead-based paint testing technologies under an inter-agency agreement. The Department has also consulted with a variety of other Federal agencies on lead-based paint issues including the Consumer Products Safety Commission and the National Institute for Occupational Safety and Health.

SENATOR MIKULSKI: Recent legislation requires you to implement a comprehensive research and demonstration program on lead-based paints hazards, with the first report due to Congress in December of this year.

a. Is the study on schedule? b. Do you have any results at this time?

ANSWER: The Department is still in the process of planning certain phases of the demonstration and, therefore, results are not available. The deadlines are under review and an extension may be requested.

TENANT MANAGEMENT/OWNERSHIP

SENATOR MIKULSKI: In its plans for converting units to tenant ownership, to what extent has HUD considered the cost associated with 1 to 1 replacement of these units as required by the Housing and Community Development Act of 1987?

ANSWER: Under the Act, the Secretary must determine that the Public Housing Agency (PHA) has certified that it has a plan which will be implemented within 30 months to add units to the available low-income housing inventory equal to the number of units that are sold for homeownership purposes. It should be noted that homeownership units, through the Act's resale restrictions, also will remain in the inventory of available low-income housing. Consequently, the

Act's "replacement" requirement has the effect of increasing the low-income housing stock.

At the Secretary's determination, a specific finding of reasonableness will be made as to the funding availability for a PHA's housing plan and that plan will be monitored through the Department's Field reporting systems.

A substantial portion of HUD's 1989 Public Housing development funds will be used for one to one replacement of units sold to tenants or otherwise demolished/disposed. Any Public Housing development funds that are available in the future as well as funds for other HUD assisted housing programs may be targeted for this purpose.

SENATOR MIKULSKI: Given the Department's emphasis on tenant management, will you be setting aside CIAP funds specifically for modernization of tenant managed projects?

ANSWER: Yes. Pursuant to Section 123 of the 1987 Housing and Community Development Act, the Department will continue to make Comprehensive Improvement Assistance Program (CIAP) funds available for tenant management projects converting to homeownership.

INDIAN HOUSING DEVELOPMENT REQUEST

SENATOR MIKULSKI: According to your budget, you are not requesting any additional funding for construction of Indian Housing. Why have you not requested any funds for fiscal year 1990?

ANSWER: Indian Housing annual development needs can be met by utilizing the units already in the development pipeline. There were 8,911 units in the Indian Housing development pipeline at the start of 1989. In addition, an estimated 1,396 units will be reserved and added to the development pipeline in 1989.

ELDERLY/HANDICAPPED HOUSING

SENATOR MIKULSKI: The Administration proposes to replace Section 202 direct loans with $78 million in credit vouchers. These vouchers are expected to help subsidize $389 million in private market loans for the construction of 7,000 elderly and handicapped units in 1990.

How does this level of production compare with the average annual production level under the Section 202 program for the last 3 fiscal years (1986-1988)?

ANSWER: The following table shows the units reserved, the borrowing authority, and the loan limitation under the Section 202 program for the past 4 fiscal years:

Fiscal Year	Units	Loan Limitation (Dollars in thousands)	Borrowing Authority (BA)
1986	11,515	$603,889,000	$493,015,000
1987	12,550	592,661,000	533,088,000
1988	11,264	565,776,000	573,261,000
1989	10,296 a/	480,106,000	428,998,000

a/ estimate

ELDERLY/HANDICAPPED HOUSING

SENATOR MIKULSKI: How does the Administration propose to allocate credit vouchers and to what extent have private lenders been queried to assess their receptivity to this proposal?

ANSWER: The credit vouchers most probably would be allocated in the same manner as the current loan limitation. Allocations will be made within the guidelines of the "Fair Share" provisions of Section 213(d) unless a waiver is granted. Private lenders have not, as yet, been queried to assess the receptivity of the credit voucher.

SENATOR MIKULSKI: Does the Administration foresee continuing credit vouchers at this or higher levels for the next several fiscal years or is this simply an interim step on the path to phasing out virtually all federally subsidized new construction of elderly and handicapped projects?

ANSWER: The Credit Voucher is a more efficient means by which such assistance can be provided. It is not an interim step towards phasing out the Department's efforts on behalf of the elderly or the handicapped. The Department is committed to providing assistance to the elderly and handicapped.

SENATOR MIKULSKI: a. What has been the Administration's experience to date regarding the use of vouchers by older persons? b. Has the Administration made any comparisons of the effectiveness of vouchers in meeting the housing needs of older persons particularly among communities with different housing options available? (Those with waiting lists for section 202, public, or other low-income housing and those with vacancies in these type units.)

ANSWER: Program statistics for the Certificate and Housing Voucher programs indicate that about one-third of assistance is provided to elderly households. Housing Voucher Demonstration research indicates that elderly households have better than average success in using Housing Vouchers. The success rate for elderly households was found to be 71.5 percent under Vouchers versus 66.5 percent under Certificates. The average rent burden for elderly households participating in the Housing Voucher program was 28.7 percent, versus 30 percent in the Certificate program.

SENATOR MIKULSKI: Has the Administration studied the incidence of older persons not finding suitable housing with vouchers compared with other subsidized housing options?

ANSWER: Yes. Preliminary findings from the Freestanding Housing Voucher Demonstration indicate that the incidence of older persons not finding suitable housing with housing vouchers was 28.5 percent. This percentage compares with an incidence of other persons not finding suitable housing with housing certificates of 33.5 percent. The difference between the two programs in the incidence of older persons not finding suitable housing is 17.5 percent.

It is not possible to compare the lack of success of elderly voucher holders in finding suitable housing with elderly persons in project-based programs, such as Section 236, Section 202, or Section 8 New Construction because program recipients in these programs do not have to find housing for themselves. They apply for units in one or more housing projects and then remain on the waiting lists for those specific projects until they are reached. Also, persons in project-based programs have already decided they are willing to move; persons who apply for vouchers and certificates do not have to be, and many choose not to participate if their current units do not meet program standards.

SINGLE FAMILY MORTGAGE INSURANCE PROGRAM

SENATOR MIKULSKI: What has HUD done to ensure that FHA's monitoring systems address all key areas of mortgage credit, valuation, loan management, and property disposition?

ANSWER: During the past 3 years, HUD has conducted five Internal Control Reviews (ICRs) on various aspects of our Mortgage Credit and Valuation Underwriting processes. As a result of these ICRs, HUD has made significant changes in its underwriting standards. Two additional ICRs are planned for fiscal year 1990.

Last year we issued a memorandum to all HUD Offices summarizing the management controls that should be used to monitor the quality of our single family mortgage insurance underwriting. A copy of that memorandum dated September 29, 1988, has been provided to Committee staff.

HUD utilizes computerized claim/default data to identify problem loans originated by lenders.

On-site reviews of lenders involve case-specific reviews of loan files. This covers the areas of mortgage credit and valuation. Loan servicing reviews of lenders are also performed. Annually, reviews are performed of the top 100 servicing mortgagees.

Property Disposition. HUD has conducted several ICRs in the Single Family Property Disposition program. These ICRs identify deficiencies in management controls which may result in fraud, waste and mismanagement. ICRs have been completed for the following areas: occupied conveyance, advertising and Area Management Broker/Procurement. As a result of these ICRs, a number of program changes have been initiated that will strengthen weaknesses identified in the reports. A description of the corrective actions has been provided to Committee staff.

In addition to the ICRs, the Office of Inspector General (OIG) regularly issues audit reports on many aspects of the property disposition program, such as the use of the bulk sales technique, losses on the sale of properties, accounting of sales proceeds and the remittance of sales proceeds to HUD in a timely manner. A number of corrective actions have been taken as the result of these audits. A compilation has been provided to Committee staff.

Program staff conduct on-site reviews of Area Management Brokers and closing agents. Reports from HUD's computerized systems are used to monitor the property disposition sales program for such items as acquisitions, sales, time-in-inventory, sales prices and losses on sales.

A new computer system (Single Family Accounting Management System) will soon replace two existing computer systems that will provide HUD managers with more accurate and timely program data. This new system will allow managers to more efficiently monitor the property disposition program.

Loan Management. Internally, Housing loan management functions are monitored at least annually at the Field Office level by Regional office staff, and at the Regional level through annual Management

Reviews conducted by Headquarters Housing staff. Housing Loan Management staff monitor assignment policy, which governs evaluation of requests from 45,000 defaulted mortgagors per year who ask for assignment of their mortgages to HUD, loan management servicing and policy development for 55,000 mortgage notes held by the Secretary and serviced by 73 local office loan management staffs, as well as housing counseling grant administration. Housing counseling funds are allocated to HUD regions based upon regional default rates and awarded to HUD-approved counseling agencies based upon scoring of annual grant applications.

Performance by Field staff is measured against formalized Management Plan Objectives which govern timeliness, debt collection and servicing standards. HUD accounting staff monitor additional standards related to cash management and servicing functions such as escrow analysis and tax payment processing.

The Headquarters Loan Management staff conducts periodic qualitative reviews of loan servicing performance through systems analysis and recurring reports.

The Single Family Default Monitoring System (SFDMS) was initially developed in 1976 and revised in 1987 in response to the Department's need for a reliable management tool. In lieu of individual notifications required prior to the implementation of the system, reports submitted on both a monthly and quarterly basis may fulfill a mortgagee's reporting requirements to the Department.

In fact, several regulatory reporting requirements may be met if lenders properly report to the SFDMS. Regulation (24 CFR 203.332) requires that lenders report to the Department: (a) monthly - all FHA loans which are 90 or more days delinquent and (b) quarterly - summary totals of all FHA loans serviced. Furthermore, lenders may also fulfill the requirements of 24 CFR 203.356 (Notice of Institution of Foreclosure) and 24 CFR 203.468 (Notice of Default) if they report properly to the SFDMS.

The Housing and Community Development Act of 1987 sets forth the Secretary's duty to annually report to Congress on HUD's single family delinquencies, defaults and foreclosures. Without the data captured by the SFDMS, this could not be accomplished.

In 1987, 1988 and 1989, Housing has continued its commitment to revise and improve this system. The output reports generated by this system provide HUD with tools for monitoring and management.

In 1989, the database was "cleaned." Housing requested that all duplicate entries and closed cases be deleted from the database. These problems had accumulated due primarily to mortgagee reporting errors. Included in our list of pending output reports is one which could be furnished periodically to lenders for reconciliation with the SFDMS.

In March 1985, the Department implemented a new automated system for the processing and payment of single family mortgage insurance claims. This system replaced a very staff intensive procedure which required each claim to be manually reviewed and processed for payment by a technician.

The implementation of this system provided the Department with the following benefits:

- the system captures data for internal control purposes;
- the system reduced losses to the Department by identifying and curtailing lender overcharges; and
- human error and oversight of the processing technician was removed.

Since automated systems cannot be designed to find all errors, a system of post audit reviews of paid claims was implemented. These post audits are designed to ensure lender compliance with HUD single family claim procedures. The Office of Finance and Accounting, Insurance Claims Division currently has a contractor performing these reviews. The Department has recovered several million dollars in overpaid claim payments to mortgagees as a result of these reviews.

The Department is also taking positive steps to provide the industry with clarifications of certain problem issues and better guidance in preparing the actual claim. In addition to a pending issuance of a Mortgagee Letter, the Department is revising its servicing Handbook as well as the claim form and instructions.

Housing performs on-site monitoring of mortgagee servicing as an oversight tool to examine whether mortgagees are complying with the regulatory requirements for servicing in subpart C of Part 203 as well as additional requirements imposed by this Office. A pattern of failure to comply is a cause for withdrawal of HUD approval of a mortgagee (24 CFR 203.500). Handbook 4330.1, Chapter 1, states that HUD has a definite interest in the quality of servicing which can minimize claims and losses in the Single Family insurance program. The regulations at 24 CFR 203.2(i) require that mortgagees must submit to an examination of that portion of its records which relates to its insured mortgage activity.

In January 1987, Housing conducted an ICR on Mortgagee monitoring, and in February 1987, issued a revised Field Office Guide for Mortgagee Monitoring, Handbook 4060.3 REV, which includes the recommendations from the ICR.

The Management Plan requires each Field and Regional Office to conduct on-site mortgagee reviews. To improve the quality and effectiveness of these reviews, Housing conducted extensive Field Office training: five workshops in fiscal year 1987, and one each in fiscal year 1988 and fiscal year 1989. In fiscal year 1988, 600 mortgagee reviews were performed, and in fiscal year 1989, 600 is the goal again . Lenders are targeted for reviews based on criteria of: FHA-insured portfolio size, number of Section 235 mortgages, and significant problems (i.e. high default/foreclosure rates, Sec. 235 problems, numerous complaints.)

Housing decided in fiscal year 1989 to centralize the monitoring of the top 100 lenders (in portfolio size) to strengthen our ability to monitor the largest multi-state mortgagees, and eliminate fraud and abuse of HUD/FHA programs.

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
WASHINGTON, D.C. 20410-8000

EXHIBIT A

SEP 29 1988

MEMORANDUM FOR: All Directors, Office of Housing
All Directors, Housing Development Division
(Category A and B Offices)
All Field Office Managers (Category C Offices)
All Field Office Chiefs (Category D Offices)

FROM: James C. Nistler, Deputy Assistant Secretary for Single
Family Housing, HS

James C Nistler

SUBJECT: Management Controls to Monitor the Quality of
Underwriting in our Single Family Programs

Over the past several years, we have developed a number of management controls to monitor the quality of our single family underwriting. Because these controls have been implemented in a somewhat piecemeal fashion, we thought it would be helpful to recap these major management controls in one memorandum so that Field Office Managers could have an overall perspective of our monitoring system and be better prepared to manage our single family underwriting process. These controls are as follows:

A. Early Default/Claim Rate Reports.

In our view, the basic measure of a lender's underwriting performance is the lender's early default/claim rate. Accordingly, we have developed Early Default/Claim Rate Reports for every lender that does business with us. These reports are sent to your office quarterly and show the early default/claim rate for your office and for each lender that does business with your office. In accordance with Regional Management Plan Goal H3, Field Office Managers should be monitoring these Early Default/Claim Reports and targeting those lenders with abnormally high default/claim rates for a high percentage of post-endorsement technical reviews (if the lender is Direct Endorsement approved) or very close scrutiny during conditional and firm commitment processing (if the lender is performing prior approval processing.) Your office should be tracking the rates of all lenders to see if there is improvement or deterioration in performance and pursuing the appropriate actions against lenders whose performance is poor. Upon request, Headquarters can provide the case numbers of the cases in default or claim to the Field Office, if the Field Office wishes to retrieve the cases for analysis. Also, these early default/claim reports can be an indicator of developing soft market conditions in certain areas of your jurisdiction.

B. Uniform Case Binder.

As you know, last year we implemented the requirement that all cases submitted for insurance endorsement be contained in a uniform case binder. On the front of the case binder is a list of characteristics about the case that the lender must check, as applicable. The purpose of this checklist on the front of the binder is to flag the Direct Endorsement (DE) cases with high risk characteristics so that your office can perform post endorsement technical reviews on these cases. Cases that have the characteristics described on the front of the case binder have higher default and claim rates than cases without these characteristics. Therefore, please alert your staff to how they can use the case binder to select cases for post-endorsement reviews.

C. CHUMS Direct Endorsement Reports.

Currently, 91 percent of our cases are processed under the DE program. Several CHUMS reports have been developed to help you monitor the quality of the underwriting under the program. We know that, in the past, some Field Office Managers were frustrated by the complexity of the CHUMS reports and that, sometimes, the reports were not accurate. We have made numerous improvements to the reports during the past year and believe that they are now easier to read and understand and are more reliable.

We believe that if you will begin to use these reports and ask your CHUMS operators to print them for you regularly, that you will be in a much better position to manage your single family underwriting responsibilities.

Listed below are the CHUMS DE reports that we believe you should be reviewing. All three of these reports are produced monthly and a detailed explanation and sample of each report is attached as Exhibit A to this memorandum.

1. Report Number F17JYCA - Analysis of Technical Reviews - Direct Endorsement. This report is produced monthly and summarizes the number and percentage of post-endorsement technical reviews performed on each lender. Use this report to make sure that your staff is reviewing a high percentage of the cases submitted by lenders with high default/claims rates. In other words, after you identify the lenders with high default/claim rates on the Early Default/Claims reports explained in paragraph A, above, use CHUMS Report F17JYCA to make sure that these high default/claim rate lenders are getting the appropriate level of review.

   This report will also show you the number of good, fair and poor ratings that the lender is receiving on these post-endorsement technical reviews. An increasing number of poor and fair ratings would be an indication of deteriorating underwriting quality, even though presently the lender may have a low default/claim rate.

2. Report Number F17GBCA - Direct Endorsement Underwriter Performance Data. This report tracks the ratings given to each DE Underwriter on the post-endorsement technical reviews. Use this report to identify underwriters that do a poor job of underwriting so that you can alert them and the companies they work for, that the ratings indicate unacceptable performance. If their performance does not improve, you then take the appropriate administrative action against the lender.

3. Report Number F17GCCA - Direct Endorsement Appraiser Performance Data. This report tracks the ratings received by each appraiser (both fee and mortgagee staff appraisers) based upon our desk review of the case during the post-endorsement technical review.

Use this report to identify poor performing appraisers that need to be field reviewed or require other administrative action to improve performance.

D. Other CHUMS Reports.

There are three other CHUMS Reports that we believe managers should periodically review to keep informed about single family operations. These reports are explained below and a detailed explanation and sample are included in Exhibit A of this memorandum.

1. Report Number F17FOCA - Appraisers Field Review Data. This report is produced monthly and tracks the number and quality of appraisals based upon field reviews. The report also tracks the timeliness of each appraiser's work by showing the average number of workdays from the date the appraisal is assigned to the date the appraisal is completed. Use this report to monitor the timeliness and quality of appraisals and to track the percentage of field reviews performed in accordance with Regional Management Plan Objective H1. This report was completely redesigned a few months ago based upon Field Office suggestions, so if you have not seen this report lately, we recommend that you take another look at it.

2. Report Number F17JLCA - Summary of Single Family Operations. This report is produced semi-monthly and contains summary data on all single family processing activities during the period. It shows information about workload - both DE and prior approval processing, field reviews, post-endorsement technical reviews, insurance endorsement, etc. and provides a breakdown of the characteristics of the cases processed - graduated payment mortgages, adjustable rate mortgages, refinances, condominiums, investors, etc. Use this report to monitor the insurance endorsement processing in accordance with Regional Management Plan Objective H2. This report is particularly useful if you need statistical information for an industry meeting, speech, etc.

3. Report Number F17ILCB - Manager's Activity/Backlog Summary. This one-page report is produced weekly for the manager. Use this report to get a quick snapshot of single family processing during the week, to judge processing efficiency and to spot any developing backlogs.

E. Indemnification Procedures.

On February 18, 1988 I sent a memorandum to all Field Offices entitled "Single Family Development - Referring Cases for Indemnification." In that memorandum, we explained that when Field Office staff find serious violations of our underwriting requirements during the post-endorsement technical reviews of Direct Endorsement cases, the Field Office should consider referring that case to Headquarters for indemnification by the lender. We are pleased to inform you that a number of Field Offices have used this indemnification procedure effectively and we encourage other offices to use it when appropriate.

F. Field Office Reviews.

Headquarters Single Family Development staff is not able to perform very many reviews of individual Field Offices. But, when we do perform a review, we use a basic guide to check the Field Office's single family development operations. A copy of the guide that we use is attached as Exhibit B. We believe that it may be helpful to you when reviewing your own office operations. This guide sets out "Core Criteria" that we check when we perform a Field Office review. These core criteria cover the fundamental single family development operations, but do not go into technical details. When periodically reviewing your own internal operations, you may find this guide useful.

If you have any questions concerning this memorandum, please call Bud Carter, Director, Single Family Development Division at (FTS) 755-6700.

Attachments

EXHIBIT # 8

5
MAY 10 1988

MEMORANDUM FOR: Judith L. Hofmann, Assistant Secretary for Administration, A

FROM: Thomas T. Demery, Assistant Secretary, H

SUBJECT: Internal Control Reviews (ICRs) - Single Family Property Disposition - Occupied Conveyance Procedures and Media Advertising Program

This is in response to your memorandum dated February 25, 1988 which transmitted to us the final reports on the subject ICRs. In accordance with your request, we have listed below the findings, recommendations and corrective action we have taken for each.

ICR - Media Advertising

Corrective action for findings 1-7 and 9 is being taken through the issuance of a memorandum to all Field Offices relating to advertising acquired single family properties. I expect this memorandum (copy attached) to be issued in the near future. This memorandum is referenced under the "Corrective Action" section of the findings.

FINDINGS	RECOMMENDATIONS
1. Determining Advertising Media to Use	
The Field Offices visited did not have a method for determining which medium would attract the buyers most likely to buy HUD properties.	Field Offices should determine the markets they are trying to reach before they place advertisements and choose the media source accordingly.

Corrective Action:

Our memorandum to all Field Offices advises them to implement the recommendation. We suggested to the Field Offices that one way they can determine their markets is by having brokers complete a questionnaire either annually or semi-annually which provides information regarding purchasers. By obtaining and summarizing such data Field Offices should be able to target their markets to get the greatest possible exposure. Therefore, we consider this issue closed.

2. Placing the Advertisement

Field Offices visited were routinely exceeding the deadline for advertising properties.	Field Offices should strictly enforce the deadline for Area Management Brokers and Realty Specialists. All properties should be advertised except those with lead based paint hazards or other conditions requiring HUD action.

Corrective Action:

Field Offices are being reminded by our memorandum that AMBs must submit their HUD 9516s (Listing Reports) in a timely manner and that they must complete and approve disposition programs to ensure that properties are listed, to the extent possible, within the 14-day time frame. Therefore, we consider this issue closed.

3. Reducing the Costs of Newspaper Advertising

Several Field Offices found means by which to reduce advertising costs.	All Field Offices should consider the following when determining the newspaper or other advertising source to use. - traffic results - target population - newspaper rate and penetration data - rates and advertising - effectiveness for different days - rates and advertising effectiveness for different sections of the paper - rates and advertising effectiveness for different sizes and formats of the advertisement - available discounts based on volume of advertising or use of an advertising agency

Corrective Action:

We are instructing Field Offices that they are to consider the criteria outlined in the recommendation when determining the newspaper or other advertising source to use. Therefore, we consider this issue closed.

4. Tracking Advertising Costs

The Field Offices visited did not use advertising cost information for monitoring or decision making.	Each Field Office should develop and use an advertising budget.

Corrective Action:

Our memorandum to Field Offices instructs them to develop and use advertising budgets. We are providing them with a copy of the ICR report's sample format to use in establishing their budgets. Therefore, we consider this issue closed.

Moreover, we are pursuing with OFA a means to track advertising costs by Field Office. This will enable Headquarters PD to monitor the field's advertising costs.

5. Tracking Sales Per Advertising Medium

The Field Offices visited did not maintain information with which the effectiveness of advertising could be evaluated.	Field Offices should adopt the approach outlined in an April 29, 1987 memorandum from the Deputy Assistant Secretary for Single Family Housing to Office Managers.

Corrective Action:

Our memorandum encourages Field Offices to adopt the procedure outlined in our April 29, 1987, memorandum. The procedure provides a means for them to measure the strength and the effectiveness of advertising PD properties. Therefore, we consider this issue closed.

6. Performing A Cost/Benefit Analysis

The Field Offices and Regional Offices visited did not analyze their advertising programs. Specifically, dollars spent and sales by medium were not tracked or monitored.	Field Offices or Regional Offices should periodically perform a cost/benefit analysis to ensure most effective spending of advertising dollars.

Corrective Action:

We are instructing the Field Offices by our memorandum to periodically perform a cost/benefit analysis to ensure the most effective spending of advertising dollars. Also, Regional Offices are being charged with the responsibility for the oversight of advertising spending. Therefore, we consider this issue closed.

7. Effectiveness of Using Classified Newspaper Advertising

The Field Offices visited did not maintain information with which the effectiveness of HUD's newspaper advertising could be compared with the effectiveness of other advertising media. However, it appears that the newspaper is an effective vehicle.	We recommend that Field Offices maximize their use of newspaper advertising by creating effective advertisements and placing them strategically in the newspaper.

Corrective Action:

Field Offices are being instructed by our memorandum to maximize their use of advertising as recommended by the ICR report. Therefore, we consider this issue closed. Also, on March 7, 1988, we advised Field Offices to develop special ads for aged properties.

8. Using the Multiple Listing Service

HUD could realize many benefits if it could list properties through the Multiple Listing Service.	HUD should continue to pursue negotiations with the National Association of Realtors and Field Offices should be

encouraged to establish positive relationships with their local Board of Realtors.

Corrective Action:

On February 9, 1988 we issued a memorandum to the Field Offices encouraging them to meet with their local NAR Boards and discuss making use of the Multiple Listing Service. We also provided the Field Offices with a NAR statement which provides the MLS policy on advertising government-owned properties. Therefore, we consider this issue closed.

9. Additional Advertising Tools

Real estate advertising specialists suggested additional advertising tools that could be effective in advertising HUD properties.	Field Offices should consider additional advertising tools to to supplement newspaper advertising if the tool can be used cost-effectively.

Corrective Action:

Field Offices currently have the authority to choose the type of media they feel is the most advantageous for them to advertise properties for sale. Our memorandum encourages them to use additional advertising such as flyers, television, radio, billboards, etc., to supplement newspaper listings. Therefore, we consider this issue closed.

ICR - OCCUPIED CONVEYANCE

Corrective action for findings 1-3 and 6-9 is being taken by the issuance of a change to the Property Disposition Handbook. I expect this Handbook Change (copy attached) to be issued in May 1988. Additionally, corrective action for findings 1, 4, 7, 9, 10, 11 is being taken by the issuance of a Guide for Field Office Monitoring. I expect this Guide (copy attached) to be issued in May 1988.

1. Determining Whether Occupancy Meets Secretary's Interest Criteria

FINDINGS	RECOMMENDATIONS
Two offices made a blanket determination that occupancy would not protect their properties from vandalism. No documentation existed to indicate that the Field Offices had performed the required analysis.	Documentation of Field Offices' analysis of vandalism should be maintained in the files and updated every six months in accordance with Handbook procedures. Regional Offices should monitor this procedure.
Field Offices are not consistent in the methods they use to perform the analysis of vacancies and acquisitions within residential areas.	Headquarters should provide the the Field Offices with more detailed instructions for determining residential areas and subsequently determining the number of vacancies and acquisitions within the residential areas.

Corrective Action:

Blanket determinations that occupancy would not protect properties from vandalism are now prohibited. Field Offices are being instructed by our Handbook change to make their determinations with regard to vandalism on a case-by-case basis and to document them accordingly. With regard to Regional monitoring, we are developing a Guide to assist Regional Offices and other personnel in reviewing single family property disposition programs including occupied conveyance. See attached memorandum dated February 23, 1988.

We are instructing Field Offices by the same Handbook change that a residential area must be a manageable size and justified in writing or drawn on a map based on defensible rationale such as a jurisdictional area for an AMB, county, town, city, census tract, zip code area, or school district. Also, the vacancy criteria has been clarified. Accordingly, we consider these issues to be closed and completed as of May 1988 when the Handbook change and Guide are distributed.

2. Notifying Occupant of Pending Acquisition of Property

One Field Office was not notifying the occupants of deed-in-lieu of foreclosure properties about the procedures to be followed for continued occupancy. A second office notified the occupants, but did not follow up with the occupied conveyance procedures.	Regional Offices should enforce compliance with the existing procedures.

Corrective Action:

With the issuance of our Handbook Change, we will have revised our procedures to require mortgagees to notify the occupant and HUD of pending acquisition. This notice is also to be sent to occupants in situations where the mortgagee is accepting a deed-in-lieu of foreclosure. Consequently, we consider this issue closed upon issuance of the Handbook change and Mortgagee Letter (copy attached).

3. Reviewing an Occupant's Request for Continued Occupancy

One Field Office was not providing occupants with the required Form HUD 9539, "Request for Occupied Conveyance." Furthermore, the requests that were received from the occupants were not maintained.	The Chief Property Officer within each Field Office should be required to review all documentation that is sent from his branch. In addition, Regional Offices should ensure that the the Field Offices are maintaining the occupied conveyance information in the property case files.

Corrective Action:

As indicated in our response to Number two above, mortgagees are being required to send out initial notices, including the HUD-9539. Also, we are advising Field Offices that the Chief Property Officer is responsible for ensuring that all requests for occupied conveyance are processed properly and expeditiously and that thorough documentation is maintained in the individual case file. Therefore, we consider this issue to be closed upon issuance of the Handbook Change and Mortgagee Letter.

4. Determining the Habitability of the Property

Two Field Offices were not performing habitability inspections for occupied properties.	Regional Offices should ensure that Field Offices are following the outstanding instructions to perform habitability inspections on properties where occupancy is approved. For deed-in-lieu of foreclosure or Section 312 properties that are conveyed to HUD, habitability inspections should be performed within a short period of time. If AMBs cannot gain access to perform the inspection, eviction procedures should be started immediately.

Corrective Action:

We are developing a Guide to assist Regional and other personnel in monitoring and reviewing single family property disposition activities, including occupied conveyance procedures. We consider this issue closed upon issuance of the Guide.

5. Determining the Eligibility of the Occupant

Field Offices do not consider the occupant's obligations in determining whether the occupant will be able to pay the fair market rent.	An occupant's fixed obligations should be considered in determining his/her ability to pay fair market rent.

Corrective Action:

We disagree with this recommendation. Inasmuch as occupied conveyance is approved only as a temporary measure of assistance to former mortgagors or tenants and subject to termination on 30 days' notice, we do not feel the need to consider the occupants' obligations. We determine whether the occupants are able to pay fair market rent by calculating their housing costs (rent plus utilities paid by the occupant). If their housing costs do not exceed 38 percent of the occupants' net effective income, then we consider the occupant able to pay fair market rent.

It should be mentioned that occupants are required to list their obligations (i.e., car loans, installment payments, credit cards) on their request for occupied conveyance (Form HUD-9539) so that we do have some knowledge of their total financial situation.

6. Improving the Notice of Preliminary Disapproval to Occupants

One Field Office is sending incomplete correspondence to occupants.	Employees should receive the necessary training for the proper form and content of correspondence. The CPO should review and sign all correspondence.

Corrective Action:

We agree with the recommendation that employees should receive the necessary training for proper form and content of occupied conveyance correspondence. This matter was discussed with the CPO during the ICR close out meeting in June of 1987. In addition, our Handbook Change includes a provision that CPOs ensure the occupied conveyance requests are processed properly and expeditiously. Therefore, we consider this issue closed upon issuance of the Handbook Change.

7. Making the Final Decision to Approve or Disapprove Occupancy

One Field Office was not adhering to the handbook instructions that require the mortgagee to convey vacant those properties for which HUD disapproved occupancy.	The CPO should require mortgagees to convey the properties vacant if HUD has disapproved occupancy. If necessary, the CPO should begin eviction procedures and disallow the eviction costs on the mortgagee's claim or withhold payment until the property is vacated. Regional Offices should monitor to ensure that the CPO is requiring mortgagees to convey vacant properties if HUD has disapproved occupancy.

This office also did not maintain in the property case file documentation regarding the decision on occupied conveyance.	Regional Offices should enforce the requirement that documentation be maintained.
This office also had a property that had been in the inventory for two years yet the property had not appeared on the AMB's accounting report.	Field Offices should be required to periodically reconcile the properties in the AMB accounting records with the Critical Path Processing System (CPPS) to ensure that all properties accounted for.

Corrective Action:

Our current Handbook instructions require that when a mortgagee conveys properties occupied without HUD approval, the Field Office must request the mortgagee to evict the occupant. This policy is being restated in our Handbook Change.

As part of the Field Offices' responsibility for monitoring claims for insurance benefits, our current Handbook instructions (paragraph 2-27 attached) provide that Field Offices are to ensure that mortgagees' claims are reduced or collection action pursued if it becomes necessary for HUD to do the eviction. Thus, we don't feel it is necessary to take action on the claim issue.

With regard to Regional Office monitoring, see Number four above and the attached Guide.

Field Offices have available to them as Appendix 48 of Handbook 4310.5 REV. 1 (attached) a checklist and summarized instructions for reviewing AMB monthly accounting reports. The instructions provide that Field Offices are to verify monthly the accuracy of the inventory reported by utilization of the CPP System's closed cases report, inventory status report, daily report of acquisitions and closings, and special inquiry reports. Therefore, we feel no need to take any additional action on this issue.

8. Determining the Fair Market Rent

In two Field Offices, the process of determining the fair market rent and executing the lease was completely delegated to the AMB without notification or approval by the Field Office.	Headquarters should clarify the outstanding instructions to approve the rent amounts and then notify the occupant of the amount. AMBs would then be responsible for collecting the rent.

Corrective Action:

Our current Handbook and Handbook Change instructs the field that they must state the rent level at the time the occupant is notified of approved occupancy and that AMBs may be used to execute the lease and obtain the rent. Our Handbook Change further advises that a copy of the signed and dated lease must be maintained by the Field Office. Accordingly, we consider this issue to be closed upon issuance of the Handbook Change.

9. Executing the Lease

Three of the offices visited were accepting continued occupancy in acquired properties without the occupants signing a lease.	Headquarters should remind Field Offices of the need to obtain signed leases. Regional Offices should monitor this activity.

Corrective Action:

See response to Number eight above. Also with regard to Regional monitoring, see the attached Guide.

10. Methodology for Monitoring Field Office Application of the Occupied Conveyance Procedures

The evaluation of the occupied conveyance procedures by Regional Offices varied widely. One office only performed an on-site review of occupied conveyance if it was considered a problem area. Another office only looked at two items pertaining to occupied conveyance.	Regional Offices should prioritize areas for review. However, low risk areas should not be overlooked. Specifically, the Regional Offices should address the Field Offices' compliance with procedures, but limit the extent of the review if the situation warrants. If time/resource constraints preclude an on-site review, then the Regional Office should require the Field Offices to submit selected information for review.

Corrective Action:

On February 23, 1988, we issued a memorandum to all Regional Directors of Housing transmitting a draft Guide to them for Field Office monitoring. This guide provides a synopsis of the occupied conveyance procedures for the reviewer to use when conducting a review. Also, since Field Offices are periodically reviewed by Regional Offices as well as Headquarters, we do not feel that there is a need for Field Offices to submit occupied conveyance materials to the Region for review. Accordingly, we consider this issue to be closed upon issuance of the Guide.

11. Monitoring the Application of the Occupied Conveyance Procedures

Cursory reviews of Field Offices are probably not adequate to evaluate the application of the occupied conveyance procedures.	The following areas should be included in the review: - Application of the criteria for occupied conveyance - determination of occupant's eligibility - maintenance of documentation received from and sent to occupants - application of the lead based paint procedures - determination of the fair market rent - execution of leases - collection of rents

Corrective Action:

See response to Number 10 above.

12. Reporting Initial and Follow-Up Findings and Recommendations to Headquarters

Two of the Regional Offices visited had not had any findings or recommendations regarding the conduct of occupied conveyance procedures for any of the Field Offices	One Regional Office was reporting initial and follow-up findings and recommendations in a manner that is applicable to all Regional Offices. We

within their jurisdiction for over two years.	recommend that all Regional Offices be instructed to report on and track findings and recommendations using this method.

Corrective Action:

We do not agree with this recommendation which suggests that we require Regional Offices to report their findings and recommendations on occupied conveyance in the same manner as required by one of HUD's Regional Program, Planning and Evaluation staff. We do not feel that this is appropriate in view of the nature of the Department's various reviews. When occupied conveyance is an issue being reviewed, it should be reported in the format required by the particular review coordinator.

In the event that you have any questions, please contact Jackie Campbell, Director, Single Family Property Disposition on 755-5740.

Attachments

JUN 15 1989

EXHIBIT [illegible]c

MEMORANDUM FOR: John J. Connors, Assistant Inspector General for Audit, ZA

FROM: James E. Schoenberger, General Deputy Assistant Secretary, HD /s/ 6/15/89

SUBJECT: Handling of Proceeds from the Sale of HUD-owned Single Family Properties

This is in response to your memorandum of May 30, 1989, on the subject report. My comments to specific areas which were the subject of the review follow:

Submission of Sales Proceeds/Sales Packages

Secretary Kemp has issued a memorandum dated June 7 to all Regional Administrators and Field Office Managers expressing his concern over proper monitoring of sales proceeds as well as other areas of the sales closing process. The Secretary has stressed that he is holding Regional Administrators and Field Office Managers personally accountable for any improvements that are needed to minimize the potential for fraud and monetary losses.

The timely and accurate submission of sales closing packages has been equally stressed along with the prompt submission of sales proceeds. We will continue to monitor progress in meeting the standards for the submission of sales proceeds and sales packages through FASTA, which will be produced on a monthly basis. These requirements have now been included in the field's Management Plan objectives, on which the field offices will be rated at the end of the fiscal year.

We fully expect that the Secretary's memorandum, as well as the more frequent reporting under FASTA and the inclusion of these standards in the Management Plan objectives, will bring about vast improvement in both of these areas.

Critical Path Processing System (CPPS)

Work is progressing towards the implementation of a new Single Family Accounting and Management Information System (SAMS) which will replace

CPPS and OFA's F-63 system. In the meantime, offices will again be instructed, in a memorandum to be issued by June 21, to maintain the CPPS system on a current basis. Increased monitoring of the field offices compliance with these instructions will be performed by Housing Headquarters staff.

In addition, Housing staff is working with staff from Information Policies and Systems (IPS) to develop several reports aimed at giving field offices more timely information on the receipt of wire transfers by the Treasury and the status of unreconciled cases. We expect to have agreement on the design and timing of these new reports by June 23. Administration expects to initiate a contract within thirty days for an independent audit firm to review SAMS to assure that, upon implementation, it meets our objectives to provide better control over all property disposition accounting and management activities, including the sales closing process.

Implementation of New Closing Agent Contracts

The Secretary has stated that he expects Regional Administrators and Field Office Managers to have closing contracts in place within 90 days of the June 7 memorandum. All new contract solicitations must be under the standard closing agent contract format, which provides for liquidated damages to cover delivery of sales packages and sales proceeds and contains specific bonding requirements. Existing closing agent contracts that do not have these provisions, must also be amended or rebid to include these provisions. We will be issuing additional instructions on the actual monitoring of closing agents, including on site visits to the closing agents office.

Property Reconciliations

OFA has issued today reports to the Field Offices listing cases where sales packages and proceeds cannot be reconciled by OFA. Specific instructions for completing the reconciliation will also be provided. Field Offices will then have 30 days to return the reconciliation to Headquarters.

Field Offices will also receive by June 30, a listing of cases which remain unmatched after the automated comparison of CPPS with OFA's A-43 and F-63 system as of May 31, 1989. Field Offices will also have 30 days to accomplish the reconciliation. The completion of these reconciliations should verify the discrepancies in wire transfers, sales packages and property inventories.

Since these issues were first raised in 1987 by your office, we have taken a number of steps to address them. Through issuances of memorandums, policy changes, development of contracts, increased monitoring and systems changes, I feel we have made some progress since that time, but there are still areas that need addressing, as evidenced by your report. I assure you that we will continue to take corrective action as necessary to improve all areas of the sales process. As part of our effort in this regard, a conference was held today with some of the Field Office Managers. This enabled senior Headquarters staff to hear first-hand some of the problems they are experiencing and to start developing possible solutions.

HT 680934

SINGLE-FAMILY MORTGAGE INSURANCE PROGRAM

SENATOR MIKULSKI: Does HUD have a system in place for tracking that all required monitoring of lenders and property appraisers is being performed and to ensure that those employing substandard practices are identified?

ANSWER: HUD's automated processing system, called CHUMS (Computerized Homes and Underwriting Management System) produces operations reports that track the monitoring actions taken by all of the Department's Field Offices as well as summary national reports. These reports, produced monthly, show the number of cases that are reviewed, the lenders involved, as well as the underwriters and appraisers for each use.

Specifically with regard to appraisers, HUD performs a Field review (site visit) on 10 percent of all appraisals performed and at least 5 percent of each appraiser's work. After the Field review, the performance of the appraiser is scored on a scale of one (poor) to 5 (good). These scores are recorded in CHUMS and each month a summary report is produced to show the numerical ratings of all appraisers. An appraiser with a low rating is provided with additional training and guidance and given an opportunity to improve his/her performance. If performance does not improve, then the appraiser is removed from the panel of approved appraisers.

In addition to this ongoing review of performance, fee appraisers must be recertified annually to remain on the approved panels. This recertification process involves a formal review of the appraiser's performance, including quality, timeliness of completion of assignments and professional conduct and practices. Appraisers that fail to meet the standards in these areas are not recertified and not reappointed to the approved panels.

HUD's Single Family Monitoring Division maintains data on lenders that have been reviewed through on-site monitoring reviews.

Lenders found to be in noncompliance with HUD/FHA requirements are requested to indemnify HUD for claim losses resulting from improper practices.

SENATOR MIKULSKI: Once problem lenders or appraisers have been identified, what systems or procedures does HUD have in place to ensure that sanctions are being taken and that, for repeat offenders, the severity of sanctions are escalated?

ANSWER: As discussed in the response to the previous question, the performance of fee appraisers is monitored on an ongoing basis throughout the year. When performance falls to an unacceptable level as shown by Field reviews and monitoring reports, the appraiser is provided with additional training and guidance. If performance does not subsequently improve, the appraiser is removed from our fee panel.

Lenders found to have engaged in serious violations of HUD/FHA requirements, or have abused the mortgage insurance programs, are referred to the Mortgage Review Board for administrative sanctions. The Board has a wide range of administrative sanctions available, including withdrawal of the lender's approval to participate in the FHA program. In cases where violations committed by a lender recur, stronger sanctions by the Board would be taken.

SENATOR MIKULSKI: Does HUD have a reliable audit tracking system in place to systematically evaluate and track changes made by HUD in response to audit findings and recommendations of the HUD Inspector General, GAO, and other organizations?

ANSWER: HUD has established an Automated Audits Management System (AAMS) which is used primarily to track the process of implementing corrective actions as a result of HUD Inspector General issued reports and non-Inspector General (i.e., non-Federal Independent Auditors) issued audit reports accepted by the Inspector General for HUD uses. The AAMS has proven to be very reliable and has been studied by other Federal agencies in the development of their systems. General Accounting Office audit reports addressed to HUD are tracked separately by the Office of Inspector General and HUD managers are provided status reports for follow-up and monitoring purposes.

SENATOR MIKULSKI: Once HUD determines that corrective actions are needed, what procedures are followed to ensure that the corrective actions have been fully implemented and evaluated to determine if they are effective in solving the initial problems?

ANSWER: HUD has established audit follow-up operating procedures in HUD Handbook 2000.6, Audits Management System. This Handbook was revised in April 1989 to incorporate the recent amendments to the Inspector General Act. These procedures require HUD program or administrative managers to: promptly evaluate finding(s)/recommendation(s) reported by auditors, determine proper corrective actions, and take necessary action to correct or otherwise resolve the issues reported. The Inspector General's office tracks all significant finding(s)/recommendation(s) and, on a selective basis, conducts corrective action verification to ensure that final action has been completed. In addition, subsequent audits are conducted on a selective basis to determine if problems identified in prior audits have been overcome.

SENATOR MIKULSKI: Does HUD have any indication of how the present level of Federal, state, local, and private homeless assistance efforts relate to the total need? How does the present federal effort relate to the total effort?

ANSWER: We have no definitive studies which relate the current efforts to the need. However, according to shelter managers interviewed in a recent HUD study, the total amount of money budgeted to be spent by the Nation's shelter providers in 1988 is estimated to have exceeded $1.5 billion. Because this figure does not include out-of-shelter services (such as community health centers and soup kitchens), the actual amount of funding being spent on the homeless is much larger. We know there are efforts being made at all levels to address that need. President Bush's decision to seek full funding for the McKinney programs reflects an understanding that there is a need for additional Federal resources.

SENATOR MIKULSKI: Does HUD have any information on the extent to which shelters and other assistance providers are participating in more than one of the various McKinney Act programs? Has this generated any comments or complaints regarding such things as required duplicative applications, reporting, record-keeping, etc.?

ANSWER: The Department does not have specific information on providers participating in more than one program, but presumes that, to the extent the programs are complementary and support a shelter or a provider's purpose, there is some use of other McKinney programs. In a recent field survey of the five largest metropolitan areas, HUD learned that shelter operators had to piece their funding together from many sources. In addition, the recent GAO study revealed that of those who received Emergency Food and Shelter funds from FEMA and also provided on-site shelter, about a third also received Emergency Shelter Grant funds. With a newly energized Interagency Council on the Homeless, HUD plans to improve the coordination of the McKinney programs at both the Federal and recipient level. While we have heard of some complaints of duplicative requirements, those are the kind of problems we will avoid in HUD with the consolidation of the homeless programs under one Assistant Secretary.

SENATOR MIKULSKI: Does HUD have any data indicating whether communities are diverting other federal or nonfederal funds away from homeless assistance as a result of the influx of McKinney Act funds?

ANSWER: We have no data available on this issue. However, we do have requirements in each program that the assistance be limited to new or increased levels of assistance. HUD staff monitoring, along with project audits, are intended to guard against communities substituting Federal funds for local funds.

STAFFING FOR MCKINNEY ACT PROGRAMS

SENATOR MIKULSKI: How many personnel or staff-year equivalents, both in Headquarters and the field, are currently being used or planned to be used in carrying out the McKinney Act provisions?

ANSWER: We have approximately 71.0 staff-years allocated to the homeless programs in 1989.

SENATOR MIKULSKI: Are staff devoted full-time to the McKinney Act, or does carrying out the Act represent additional duties for staff working on other programs?

ANSWER: This depends largely on where the staff is assigned, and what specific program they are working on. In the Field, it is normal procedure for staff to work with a variety of programs. In Headquarters, Housing staff involved with McKinney Act programs generally handle only these programs; CPD staff generally handle McKinney Act as well as other programs.

SENATOR MIKULSKI: Is this a hardship?

ANSWER: No. The fact that some staff handle McKinney Act and other programs is not a hardship. However, the current situation in which the McKinney Act program responsibilities are dispersed throughout the Department has not allowed for the coordination that these programs need and deserve. To address this situation, I plan to consolidate all the McKinney programs within one office, with the exception of the Section 8 Single Room Occupancy program, which will remain within the Office of Housing for the present time.

SENATOR MIKULSKI: What are the future staffing plans for the homeless programs both in Headquarters and in the Field?

ANSWER: Staffing plans for the homeless programs will naturally depend on the program levels that are approved. I have already indicated to you that additional staffing for four programs, Transitional and Supportive Housing, Emergency Shelter Grants, Comprehensive Service and Shelter, and Supplemental Assistance for Facilities to Assist the Homeless, may be required if President Bush's initiatives in these areas are enacted.

SENATOR MIKULSKI: We understand that HUD is studying the impact of the 1986 tax changes on private investment in low-income housing. Would HUD provide a summary of its findings to date regarding this matter?

ANSWER: HUD has no specific study underway but continually monitors the effects of tax legislation on housing. It is clear that tax reform has discouraged investment in rental real estate. New multifamily starts have declined steadily from 576,000 in 1985 to 349,000 in 1988. Only a part of this decline can be attributed to a bulge in multifamily starts in the mid-1980s in anticipation of tax reform. A long run consequence of lower investment in rental housing will be higher rents. So far this effect has not appeared. Between September 1986 (immediately prior to tax reform) and February 1989, the rental component of the Consumer Price Index rose less than the all-items CPI, 9.5 percent compared to 10.4 percent. The delayed impact on rents may be attributed to the consequences of the heavy investment in rental housing resulting from the very favorable tax treatment under the Economic Recovery Act of 1981. The vacancy rates in the mid-to late-1980s exceeded any observed since the early 1960s. We will continue to monitor the cmpact of tax reform on the housing market.

SENATOR MIKULSKI: Does HUD have a position regarding the utility of mortgage revenue bonds in promoting first time homeownership? Would HUD be in favor of Congress extending authority to issue these bonds past December 31, 1989? Does HUD believe that more efficient ways exist to promote homeownership? Would these approaches provide a deeper subsidy
to overcome barriers to homeownership?

ANSWER: The Administration has not recommended an extension of mortgage revenue bonds (MRBs). The single-family program has to date been ineffective in expanding homeownership into non-traditional groups. In addition, MRBs have proven to be an inefficient mechanism since only 12 to 45 cents of every dollar of lost tax revenue actually goes to the benefit of the homeowner.

I believe that Congress should look more closely at improving mortgage credit certificates (MCCs) as an alternative to single-family MRBs. States are allowed to trade-in all or part of their MRB allocation in exchange for MCCs offer two distinct advantages: (1) all of the foregone tax revenue is passed on to the homeowner; and (2) assistance is no longer needed. These benefits result in better allocation of Federal dollars. The problem with MCCs in their present form is that many of the low and moderate income people that MCCs are designed to help do not have sufficient tax liability to make sufficient use of the MCC tax credit. This can be resolved by granting the homebuyer a tax refund if the full credit cannot be taken. This would be similar to the earned income credit. MCCs will expire at the end of December, unless extended.

1990 Pay Increase

SENATOR MIKULSKI: Last year you were able to absorb the pay increase for HUD employees because of the slippage in awarding the

HIIPS contract. How do you plan to implement increase that may occur in FY 1990?

ANSWER: The Department's request for salaries and expenses funds is tightly constructed. It provides for two new efforts: full implementation of the Fair Housing Amendments of 1988 and the initial phase of installing the HUD Integrated Information Processing Service (HIIPS). The ability to absorb significant unbudgeted costs is extremely limited, and it would be premature to define any specific items at this time. It is apparent, however, that the bulk of the absorption would have to occur in the personal services area, primarily through a reduction in staff-years.

INTERNAL CONTROL PROCEDURES

SENATOR MIKULSKI: Does HUD have a description of its internal control objectives and techniques for each of its programs and their respective activities or components?

If not, how can HUD annually certify compliance with the Comptroller General's standards?

ANSWER: Yes. When the Federal Managers' Financial Integrity Act was passed, the Department conducted a comprehensive study of vulnerabilities within internal control systems, including descriptions of objectives and techniques. These are reviewed annually. For new and substantially modified programs, we perform up front assessments of vulnerabilities, and identify control objectives and techniques.

SENATOR MIKULSKI: Is this information available and easily accessible for examination in a central location or locations for all HUD programs?

ANSWER: Program offices throughout the Department are responsible for maintaining information pertaining to internal control systems within their activities. For significant programs we maintain information in a central location.

SENATOR MIKULSKI: What procedures are used to ensure that these descriptions are updated to reflect changes in the existing internal control system and that new activities are added?

ANSWER: The program offices are required to perform up front assessments of vulnerabilities that include control objectives for new and substantially modified programs.

ADP Services Costs

SENATOR MIKULSKI: You have requested an increase in 1990 for automated data processing services for the HUD Integrated Information Processing Service (HIIPS) conversion. I understand that there has been a slippage in awarding this contract. What has slowed this process? Has the RFP gone out and when do you expect to award a contract?

ANSWER: The Request for Proposals (RFP) for HIIPS was issued in June 1988, and vendors were requested to submit their proposals to HUD during October 1988. The contract was expected to be awarded and work to begin during the summer of 1989. Due to the large number of questions received from vendors, as well as the need to amend the RFP to incorporate FTS 2000 services in accord with guidance from the General Services Administration (GSA), and at the request of several vendors, the RFP was amended to extend the due date to January 1989. As a result, the expected time for the award of the contract was changed to the fall of 1989; from the fiscal year 1989 time frame to fiscal year 1990.

The Appropriations Subcommittees of the Congress were advised of the slippage, and with their approval, the funds appropriated for that purpose in 1989 have been used to fund a portion of the pay increase which became effective during January 1989. There has not been any additional slippage in this project.

WORKFORCE REQUIREMENTS

SENATOR MIKULSKI: Workforce readiness is a particular concern of mine. If we prepare for the demographic shifts taking place in our country, then we won't be able to retrain and recruit the kind of workers we need.

I understand that the Department has some workforce needs of its own, specifically more funds for more people, to effectively implement your programs.

How may more people do you feel you need and how much would this augmentation cost in your 1990 budget?

ANSWER: The number of people we need will depend on the action by the Appropriations Committees on HUD programs for 1990. As we informed the Committee in an insert for the record on page 91, an estimated 107.2 staff-years will be needed over the 1990 Budget request in order to carry out the Budget amendments submitted by President Bush. On the other hand, to fund HUD programs in 1990 at 1989 levels and to meet workload we currently estimate, an additional 935.5 staff-years would be needed.

SENATOR MIKULSKI: Did you ask OMB for these people?

ANSWER: We asked the OMB for sufficient staffing to support the HUD programs at levels we have recommended and based on our workload estimates at the time. No staffing request was made for the Bush Budget amendments, however, since these changes happened separately from the normal budget process. Some workload numbers, in addition would have changed--both upward and downward--based on more recent forecasts.

MINORITY AND WOMEN HIRING

SENATOR MIKULSKI: What is the percentage of women and minorities who hold top level executive positions (GS-13's and above and SES) within your agency?

ANSWER: As of June 17, 1989, women and minorities accounted for 42.9 percent of the 2,885 full-time permanent employees in the GS/GM 13-18 grade range, and for 31.6 percent of the 95 SES positions filled at that time. More specifically, women held 797, or 27.6 percent, of the GS/GM 13-18 positions, and minorities held 766, or 26.6 percent, of the positions in this range. Women held 14, or 14.7 percent, of the SES positions, and minorities held 18, or 19.0 percent of these.

SENATOR MIKULSKI: What are you doing to improve these numbers?
ANSWER: While we believe that our record of hiring minorities and women to high level positions is good, we continue to try to improve by expanding the applicant pools of qualified candidates, increasing our outreach and recruitment efforts, and encouraging the use of career development programs designed to prepare individuals for higher level positions.

SENATOR MIKULSKI: How do you plan to accomplish this?
ANSWER: We plan to accomplish this through a variety of efforts, including continuing to update and expand the mailing lists of organizations which receive vacancy announcements; continuing to participate in job fairs, conducting in-house workshops geared toward enhancing employees' skills, knowledge and abilities; and continuing to expand our applicant files by collecting data on potential applicants during conferences sponsored by national organizations. In addition, we will encourage the use of the Upward Mobility program and other career development opportunities, and will encourage participation in the Office of Personnel Management's Women's Executive Leadership Program.

SENATOR MIKULSKI: What kind of statutory or regulatory changes would be needed?
ANSWER: The activities described above are ongoing. No statutory or regulatory changes are required to carry out these plans.

HUD COINSURANCE PROGRAM

SENATOR MIKULSKI: Can you provide the Committee with an estimate of the potential losses to the FHA insurance and GNMA guaranty fund attributable to the 223(f) program for fiscal year 1989, fiscal year 1990 and fiscal year 1991?
ANSWER: GNMA estimates net outlays on projects insured under the section 223(f) of the HUD coinsurance program for fiscal year 1989, fiscal year 1990 and fiscal year 1991 are approximately $10 million. GNMA outlays for all programs insured under HUD's coinsurance program for the same period is approximately $11 million. Except for certain administrative costs, GNMA is fully indemnified by FHA on coinsurance losses.

The table below reflects the above:

GNMA Coinsurance Outlays

	1989	1990	1991	Total
	(Dollars in Thousands)			
Section 223(f)	$77,319	-$56,448	$10,963	$9,908
Section 221(d)	8,420	-5,769	-1,289	1,362
	85,739	-62,217	-12,252	11,270

The table below reflects the projected claims paid by the FHA Fund resulting from 223(f) and Section 221(d) coinsurance claims for the period 1989-1991.

FHA Coinsurance Outlays

	1989	1990	1991
	(Dollars in Millions)		
Section 223(f)			
DRG................	$73.2	$288.9	$34.8
Other...............	20.5	94.6	79.5
Total.............	93.7	383.5	114.3
Section 221(d)........	...	95.0	95.0
Total Coinsurance.....	93.7	478.5	209.3

SENATOR MIKULSKI: Can you presently assess whether the 223(f) losses are attributable to program design or poor implementation?

ANSWER: We believe that the losses under the 223(f) coinsurance program are attributable to weaknesses in both program design and implementation.

Program Design Weaknesses. As presently structured, the 223(f) coinsurance program allows coinsured mortgages, on refinance transactions, up to the greater of: (a) 70 percent of value, or (b) the amount required to pay off existing indebtedness, plus certain specified costs (including the cost of repairs). This has enabled project owners to take out substantial equity through "bridge loans", and then pay off the bridge loan with a coinsured loan. With little or no real equity in a project, the borrower has no motivation to fund shortfalls if the project is not generating sufficient income to meet debt service requirements. Four years ago we proposed a rule change which would have limited "equity takeouts," by linking the maximum mortgage amount to a sliding-scale percentage of acquisition cost for 4 years. This proposed rule change was rejected at the time by OMB. We intend to push again for this rule change before the end of this fiscal year.

As presently structured, the 223(f) coinsurance program allows participation by lenders who have initial "sound capital resources" of $1,500,000, including $500,000 in liquid funds. We now recognize that these requirements have permitted participation by lenders who are under-capitalized, with little liquidity--who, in short, have little of their own funds "at risk." We recognize the need to increase the lenders' capital and liquidity requirements for the 223(f) and 221(d) coinsurance programs. Lenders should also be required to establish and maintain dedicated, funded accounts to cover potential coinsurance losses. We have implemented stronger capital and liquidity requirements for the 232 coinsurance program and plan to phase-in similar requirements for the 223(f) and 221(d) coinsurance programs.

Program Implementation Weaknesses. During the first years of the 223(f) coinsurance program (1983-1986), priority was placed on reviewing and approving lender applications to participate in the program. There was little emphasis on monitoring, in spite of the fact that over $3 billion in coinsured loans were closed during this period.

The cumulative default rate under the 223(f) coinsurance program is approximately 13% of loans closed. However, approximately 75% of these defaults are attributable to a single lender--DRG Funding Corporation. Excluding DRG's portfolio, the overall default rate of the 223(f) coinsurance program would have been approximately 5%. DRG's defaults resulted from a combination of overmortgaging and a high volume of lending activity in soft market areas, such as Louisiana, Texas, Oklahoma, Mississippi and Georgia. DRG has been suspended from participation in all Federal government programs pending completion of an FBI criminal fraud investigation and any enforcement actions that may follow.

SENATOR MIKULSKI: Could some lenders despite statutory and regulatory restrictions, originate unsound loans?

ANSWER: Yes, it is possible for coinsuring lenders to originate unsound loans because, under its coinsurance programs, HUD delegates, to approved lenders, full authority to originate, process, underwrite, issue commitments for and close coinsured loans. Because the lender shares the risk with HUD, it should be in the lender's long-range economic interest to create sound loans.

SENATOR MIKULSKI: If unsound loans were made why did existing HUD monitoring programs not identify the problem?

ANSWER: Despite limited monitoring capabilities in the early years of the 223(f) coinsurance program, HUD staff did identify DRG's underwriting deficiencies. DRG was approved as a coinsuring lender in April 1983. A year and a half later, in November 1984, HUD put DRG on probation because of unsatisfactory underwriting. For 6 months, DRG was required to submit all its cases to HUD for precommitment review. In May 1985, HUD's probation and precommitment review requirements were lifted, based on DRG's presumed understanding of HUD's underwriting requirements. In July and August 1986, HUD conducted an on-site review of DRG. In March 1987, HUD issued its report on DRG, which cited continued underwriting deficiencies and directed DRG to implement major corrective actions. In August 1987, HUD put DRG on limited precommitment review. In April 1988, HUD extended its precommitment reviews of all of DRG's cases. DRG remained under precommitment review until it was defaulted by GNMA in September 1988.

SENATOR MIKULSKI: Can you also indicate why the financial problems now evident went unchecked for so long despite industry concern communicated to HUD as indicated by 1986 correspondence from the Mortgage Bankers?

ANSWER: In July 1986, the Mortgage Bankers Association (MBA) of America wrote to then Secretary Samuel R. Pierce, Jr., and urged HUD to strengthen its capacity for monitoring coinsuring lenders and enforcing program requirements. HUD responded quickly to the MBA's concerns and suggestions by taking the following actions:

- In July 1986, HUD began an in-depth on-site review of DRG's coinsurance operations and announced plans to conduct similar reviews of other lenders with significant portfolios.
- In August 1986, HUD reorganized its coinsurance operations, elevating coinsurance from a branch level to a division level and assigning more staff. At the same time, HUD created, within the Coinsurance Division, a Coinsurance Monitoring Branch to be responsible for remote and on-site monitoring of coinsuring lenders.
- In August 1986, HUD contracted with Peat Marwick Main and Company to develop a computerized system to enable HUD to

remotely monitor lenders' underwriting of 223(f) coinsured loans. The Coinsurer Analysis System (CAS) became operational in 1987 and was expanded in 1988 to analyze 221(d) coinsured loans.

While the previous Administration took steps, beginning in 1986, to increase monitoring of coinsurance lenders, there was the belief that the economics of the program would make it self-policing. Policy makers believed that the risk-sharing aspect of the program would motivate lenders to underwrite sound loans. If a lender made too many bad loans, it would fail because its losses would exceed its income.

SENATOR MIKULSKI: How can we prevent this problem from recurring?

ANSWER: HUD intends to prevent this problem from recurring by implementing the following actions:

- Revise the maximum insurable loan requirements for refinance transactions under the 223(f) coinsurance program to prevent mortgagors from "cashing out" and ensure that they have real equity in their projects;
- Strengthen the capital, liquidity and financial reporting requirements for coinsuring lenders and require lenders to establish funded dedicated accounts to cover potential coinsurance losses;
- Increase HUD monitoring of coinsuring lenders' activities, including: issuance of firm commitments, underwriting, loan servicing and management oversight; defaults, acquisition, disposition and claims; and financial condition; and
- More vigorously enforce program requirements by imposing administrative sanctions on lenders who violate those requirements and establishing additional financial disincentives for unsound underwriting.

On May 5, 1989, HUD announced that it was initiating a comprehensive review of its multifamily coinsurance program. This evaluation period, which will continue through September 1, 1989 will include: (a) a moratorium on new lender applications and approvals; (b) expansion of HUD monitoring activities for all existing coinsuring lenders; (c) increased enforcement activities with respect to certain lenders which have violated HUD requirements; and (d) design and implementation of appropriate program changes.

SENATOR MIKULSKI: Please provide the numbers of FHA staff devoted to program monitoring for the years 1983, when the first loans were endorsed for coinsurance, through FY 1989.

ANSWER: FHA staff resources devoted to coinsurance program monitoring are summarized on the following table:

Fiscal Year:	1983	1984	1985	1986	1987	1988	1989
			(Staff Years)				
Headquarters							
Program.....	2	2	2	3	7	8	10
Technical.	2	2	2	3	6	6	6
TOTAL	4	4	4	6	13	14	16

From 1983 through July 1986, no FHA staff were specifically assigned to coinsurance monitoring. Limited monitoring was done by Headquarters Coinsurance program staff who were primarily responsible for program development and reviewing lender applications to participate in the various coinsurance programs, as that was the priority of the HUD administration during that period. The Coinsurance Monitoring Branch was established in Headquarters in August 1986, with an initial allocation of 6 professional staff.

Technical Support Staff in Headquarters also participate in monitoring activities. Their involvement includes the review of the underwriting from architectural, cost, valuation, and mortgage credit viewpoints, which activities take place both in the Field and through desk reviews of processing submitted in connection with certain waiver requests. Limited monitoring was done by this staff whose coinsurance activities also included development of underwriting instructions and review of lender applications and test cases. Although the number of Technical Support staff-years spent on coinsurance monitoring has increased, there has been no increase in the number of Technical Support staff. The additional staff have been made available through a reallocation of existing staff and of priorities.

SENATOR MIKULSKI: Are there areas of research that are unfunded?

ANSWER: Because of limited resources and the emphasis on the lead-based paint testing and abatement demonstration and policy report, we have not been able to fund several projects, or have delayed their funding. These projects include: identification of barriers to affordable housing; identification of barriers to equal opportunities in housing; evaluations of the HUD homeless programs; completion cost benefit evaluations of tenant management; and, unfortunately, very large scale projects that support the Secretary's priorities.

SENATOR MIKULSKI: What is HUD doing to try to learn about the real housing needs of this nation's poor people? Of the elderly? And frail elderly? Of the homeless?

ANSWER: HUD has an ongoing activity to monitor the housing needs of low-income people through analysis of the data produced by the American Housing Survey. These data are used to construct and periodically update HUD's "worst case" housing model, which identifies the number of low-income people nationally with various severe housing problems such as excessive rent burdens.

HUD's work on identifying the needs of the homeless includes a 1988 study of national survey of shelters for the homeless, which looked at shelter capacity and types, clients, funding and operation and services. HUD is also in the process of completing a study of the homeless assistance activities of the five largest metropolitan areas to learn how these areas plan for, coordinate and provide homeless assistance.

With respect to identification of the needs of the frail elderly, HUD is completing a Congressionally-mandated report on alternative ways to provide and fund congregate services to this group.

SENATOR MIKULSKI: What is your current research agenda and how was it developed? Do you coordinate all of the offices in HUD (i.e., Public/Indian Housing, Community Planning and Development, etc.) in setting your agenda?

ANSWER: Our research agenda for fiscal year 1990 will complement and support the new policy priorities of Secretary Kemp. These priorities are: eliminating the tragedy of homelessness;

creating increased economic opportunities for the poor; empowering grassroots groups through resident management and homesteading; waging war on drugs; promoting housing affordability; and enforcing the right of all Americans to fair and open access to housing opportunities. These priorities fit within the existing research priorities described in our Fiscal Year 1990 Budget submission. However, because of the size of PD&R's discretionary research budget, most of these new priorities will have to be reflected in projects under budget subsequent to the Fiscal Year 1990 Budget.

The projects we will fund in 1990 from our discretionary funds have been and will continue to be designed with consultation from all the other offices in HUD. At the beginning of April, much earlier than the initiation of the formal budget process, the Acting Assistant Secretary for Policy Development and Research issued a call for research ideas to other offices. After further consultation with these offices, we will know what changes in our research agenda may be necessary and will inform the Committee.

SENATOR MIKULSKI: The Fair Housing Act Amendments, recently passed, have augmented your responsibilities. What have you done to implement this new legislation?

ANSWER: On January 23, 1989, the Department published regulations to implement the Fair Housing Amendments Act of 1988. The Office of Fair Housing and Equal Opportunity provided training to approximately 200 Regional and Headquarters staff on the new provisions of the Act, the new regulations, and the new complaint processing procedures. Additionally, the Office of FHEO held a National Fair Housing Assistance Program Policy Conference for the 120 State and local agencies that are funded by HUD to process housing discrimination complaints. The plenary session, addressed by Secretary Kemp, and subsequent workshops dealt with the new requirements imposed on the agencies by the Amendments.

Since March 12, 1989, the effective date of the Act, through mid-July the Department has officially received nearly 2,500 complaints, of which 1,000 were referred to substantially equivalent State or local agencies. HUD Regional Office staff has responsibility for processing the remaining complaints, and has completed 325 cases of which 65 were successfully conciliated.

Headquarters is now reviewing 270 cases for "reasonable cause" determinations. The new authority to obtain prompt judicial relief for complaints--Temporary Restraining Orders (TRO)--has precipitated a number of settlements, immediately prior to the filing of a motion by the Department of Justice for a TRO.

Since March 12, 1989, we have met twice weekly with the Department of Justice to ensure coordinated and effective implementation and enforcement of the Amendments. We will shortly confirm this coordination through a Memorandum of Understanding.

On May 15, 1989, the Department conducted a training meeting in St. Louis, Missouri, for 43 fair housing enforcement staff of 23 State and local fair housing enforcement agencies with which we are contracting to investigate complaints of discrimination based on the two new covered classes--handicapped persons and families with children.

Finally, an additional 168 positions are being provided (68 in Headquarters and 100 in the Field) to carry out these new responsibilities in the Office of Fair Housing and Equal Opportunity, the Office of General Counsel, Field Legal Services, the Office of Administrative Law Judges and the Office of Procurement and

Contracts. Funds for complaint investigations, training, travel and other support requirements are also being provided.

SENATOR MIKULSKI: If tax incentives are offered in future enterprise zone programs, what would be the potential cost in terms of foregone tax revenues?

ANSWER: These estimates are currently being developed by the Administration. I believe, however, that over time the revenue generated from new and expanded businesses and the jobs created will much more than pay for any foregone tax revenues which may be lost initially.

SENATOR MIKULSKI: Will businesses locate in designated areas with only a waiver of HUD regulations as an incentive? If these regulations are waived in enterprise zones, what is the adverse impact? Should these regulations be waived in total?

ANSWER: This is one of the reasons why HUD believes that it is critical to the success of Federal Enterprise Zones to provide significant tax incentives.

The only basis for waiving a regulation would be if it is demonstrated that a benefit would be gained by the waiver and a determination is made that there would not be an adverse impact.

Waiver of HUD regulations alone is probably not sufficient incentive. HUD intends to review individual waiver requests in light of the authorizing statute as well as its impact.

SENATOR MIKULSKI: Do enterprise zones lead to residential displacement? For example, increased economic development could lead to increased rents, which low-income residents cannot afford. As a result, these people could be displaced.

Do enterprise zones give any special considerations, such as preferential hiring, to displaced persons?

ANSWER: No studies have yet been done to address this issue in the State enterprise zone programs. Although the focus of Enterprise Zones is on non-residential activity, there may be an impact on housing availability or cost in the Zone area. In developing our proposal for Federal legislation, we are considering recommending that part of the local Zone strategy deal with the retention or provision of affordable housing for Zone residents.

Enterprise Zones are focused on providing entrepreneurship and job opportunities to Zone residents. Preferential hiring considerations are not given to displaced persons.

SENATOR MIKULSKI: One criticism of enterprise zones is that they only encourage business relocations, merely shifting economic activity and jobs from one area to another without creating new economic activity and jobs. What are the Department's views on this?

ANSWER: This has not been the experience in State enterprise zones. The data for the Enterprise Zone study done by HUD in 1986 suggested that relatively little relocation occurred either within the Zone or from outside the Zone. Also, the thrust of Secretary Kemp's proposals is to encourage entrepreneurship by Zone residents. To minimize relocation, it is important to craft the designation process and tax incentives to encourage this type of small business "start-up" and expansion within the Zone.

SENATOR MIKULSKI: If enterprise zone incentives are sufficient to attract businesses into a distressed area, do they place businesses, operating close to but outside of a zone, in a weaker competitive position?

ANSWER: The impact of economic development activities is not confined to a single area. To the extent that Enterprise Zone activities result in stimulating new economic activity and community revitalization, this will have a positive effect on the surrounding area. Businesses located near an Enterprise Zone that serve the same area with a similar product may conceivably be at a competitive disadvantage if a new competitor is established in the Enterprise Zone. However, we would anticipate that most jurisdictions would avoid saturating the marketplace with such ventures.

SENATOR MIKULSKI: Title V of the McKinney Act deals with making surplus federal property available to the homeless. What actions has HUD taken to implement Title V?

ANSWER: HUD has periodically canvassed GSA and other Federal landholding agencies to collect data on excess, surplus, underutilized and unutilized properties as facilities to assist the homeless, and publishes the determinations in the Federal Register. HUD has analyzed over 3,000 of these data sheets and found over 1,500 buildings and 500 parcels of land suitable for facilities to assist the homeless.

SENATOR MIKULSKI: Is Title V workable?

ANSWER: While the process for making certain Federal properties available to the homeless is inordinately complex and cumbersome, it is beginning to work. With some legislative changes to the process (already proposed) and some fine tuning based on our recent experience, the homeless will be able to utilize a portion of the identified Federal properties.

SENATOR MIKULSKI: Why or why not?

ANSWER: There is considerable confusion as to the intent of the Title V provisions. The "emergency/temporary" language of the statute is being ignored by the homeless providers who seek long-term or even permanent facilities to assist the homeless under this Title. The result of this confusion has been accusations by homeless providers that the Federal government has failed to meet its responsibilities under the Act.

SENATOR MIKULSKI: A number of the McKinney Act provisions require some monitoring to ensure compliance by the recipient after approval of the grant; e.g., matching funds, length of use of the facility, and eligible expenditures.

How is HUD ensuring compliance with these provisions under the various programs? In the ESG program, do the state and local governments, or HUD, monitor compliance by the shelters?

ANSWER: We ensure compliance in several ways. First, we have reporting requirements which enable us to discern compliance. We also review recipients on-site to ensure compliance. In the ESG program, we expect the State and local recipients to review shelters for compliance, but during our review of recipients we will also visit some shelters to help us determine how well the State or local grantee is carrying out its responsibilities.

SENATOR MIKULSKI: Has this policy (church-state) affected the usage of McKinney Act Funds for operations and maintenance or essential services rather than increasing shelter space?

ANSWER: We do not have any data that would answer the question. However, we think that it is quite likely that some religious groups would seek funds other than McKinney Act funds for capital improvements and apply for McKinney funds for operational costs and essential services.

SENATOR MIKULSKI: Has HUD gathered any data on the extent to which its policy regarding capital improvements on religious facilities has resulted in non-applications from such organizations?

ANSWER: While the Department has not gathered data which would indicate that our policy has resulted in religious organizations deciding not to apply for assistance, we believe that our policy has evolved into a workable system. As you know, the Department went to some lengths to try to provide an alternate mechanism to enable religious organizations to participate. As a result, we have not had many complaints. We are continuing to look at the issue to see if it can't be made even more workable.

SENATOR MIKULSKI: Does HUD make any internal use of the Comprehensive Homeless Assistance Plans (CHAPs), either for compiling data or evaluating applications?

ANSWER: HUD has only conducted a limited analysis of CHAPs to date. The highly individual nature of the CHAP, in conjunction with the varying sizes of the jurisdictions preparing them, has resulted in documents that are not standardized. Thus, it is difficult to use them for national data collection comments.

SENATOR MIKULSKI: Are there any modifications of the CHAPs' contents deemed advisable, or under consideration?

ANSWER: The Department will be examining the whole CHAP process as part of the effort to prepare a final CHAP rule. To help in this process, the Department has solicited input from CHAP preparers which, along with their annual reports to the Department, will be the basis for determining whether any modifications are necessary.

SENATOR MIKULSKI: Can you cite examples of specific, tangible benefits resulting from CHAP preparation?

ANSWER: Many communities have done a basic needs analysis due to the CHAP requirement. Others have begun to connect data that was available from many sources; thus, producing a more complete picture of local needs, facilities and services. State homeless staffs have commented that the CHAP has helped consolidate and coordinate efforts.

SENATOR MIKULSKI: What typically, would you say it costs a city or state to prepare a CHAP?

ANSWER: It is difficult to estimate the cost given all the variables--jurisdiction size, availability of data, level of involvement in homeless programs etc. However, the Department believes that the first CHAP, since it broke new ground, was likely the most costly. As data bases are developed and information networks are put in place, the level of effort needed to compile the CHAP should decline.

SENATOR MIKULSKI: Applications for the Transitional and Supportive Housing Demonstration funds earmarked for permanent housing for the handicapped last year were far short of the amount available. Has HUD determined what caused the low number of applications?

ANSWER: Based on an informal survey of State applications last year, HUD determined the following caused the low numbers of applications:

- Lack of State funds available for the match;
- Insufficient time to process applications; and
- Poor timing--State funds had already been allocated before applications were due in to HUD.

SENATOR MIKULSKI: Have subsequent offerings resulted in increased applications?

ANSWER: Subsequent rounds have seen increased applications. From the second round to the third round, the number increased by about 60 percent.

SENATOR MIKULSKI: If not, has the language in the McKinney reauthorization which allowed reallocating these funds been used?

ANSWER: The McKinney reallocation provisions have been used. Funds originally allocated for second round permanent housing, which were not obligated, were subsequently reallocated.

SENATOR MIKULSKI: To what use were they reallocated?

ANSWER: The unused funds ($23 million) were reallocated from permanent housing to the transitional housing component of the Transitional and Supportive Housing Program.

QUESTIONS SUBMITTED BY SENATOR WYCHE FOWLER, JR.

DECONTROL OF PUBLIC HOUSING

SENATOR FOWLER: I am well aware of your support for such decentralizing concepts as tenant management. That, of course, raises many questions about how we will use the resources we already have in place in our public housing authorities. It also makes me wonder whether you would support what might be considered a more interim step of decentralizing existing authorities and running them on a more business-like basis.

The problem we run into with such a concept is, of course, our mandate to serve the poorest and neediest. It seems to me that even with tenant management we would at some point run up against the same issues of eligibility for public housing, of the rent structure in relation to the market and in relation to family/unit size--all of these concerns which we now regulate so strictly. These restrictions are designed more to meet policy goals than to achieve management efficiency. Do you favor reexamining these policy goals, as well as management structures? As Senator Kerrey pointed out yesterday, we already run the risk of underserving those who are on the verge of working their way out of public housing, and at the same we do not come close to meeting the enormous needs of the totally destitute.

ANSWER: Resident management and urban homesteading are priority goals in HUD. The Department is committed to providing opportunities for Public Housing residents to manage and/or own their units. The intent is to develop a cost-effective way to operate Public Housing and, at the same time, provide opportunities for residents to move out of poverty. Projects operated by residents generally are well run with high rent collections and in good physical condition. The modernization of tenant-managed projects is likely to be sustained. In sum, the projects managed by tenants are operating on a business-like basis.

At the same time, there is a need to provide flexibility for well-managed Public Housing Agencies (PHAs) to operate with fewer HUD requirements, under HUD's decontrol program. Decontrol allows well-managed PHAs to be relieved from HUD review and paperwork requirements. This offers eligible PHAs greater flexibility and leeway in making management decisions. HUD will decontrol those PHAs where their track record indicates business-like performance. There were 629 PHAs under decontrol as of December 31, 1988.

SENATOR FOWLER: Have you considered how existing PHA resources can be adapted, through a combination of changes in policy and management structure, to address this dilemma?

ANSWER: HUD has reexamined policy goals and management structures under President Bush and Secretary Kemp's leadership. HUD cannot afford to replicate failure, but must replicate proven examples of success. This will require policies to ensure the presence of successful role models and to keep families together. It will require the swift elimination of illegal, anti-social activities of substance abuse and narcotics peddling by the implementation of drug prevention and control programs.

Resident management is one of the programs that has proven successful in resolving the "endemic" problems of Public Housing. Currently, work is underway to assist Resident Management Corporations and Councils, in partnership with PHAs, to take advantage of the resident management and homeownership provisions of the Housing and Community Development Act of 1987. HUD provided $2.5 million for technical assistance to 27 Resident Management groups in 1988 to build capacity for management and homeownership. Another $2.5 million will be awarded to approximately 30 groups by September 30, 1989.

In addition, HUD is working with State, local, and other Federal agencies as well as with resident groups, PHAs and private organizations to provide access to employment, economic development, child care and other supportive services to mainstream Public Housing tenants. These actions will make it possible for tenants to improve their economic circumstances and to take control of their lives. Nevertheless, HUD still will not be able to serve all those who are eligible whether they are "on the verge of working their way out of Public Housing" or "totally destitute." However, the Department will serve both better.

QUESTIONS SUBMITTED BY SENATOR FRANK R. LAUTENBERG

DRUG PREVENTION ACTIVITIES

SENATOR LAUTENBERG: First, I want to thank you for the support you have expressed for the Public Housing Drug Elimination Act (PHDEA), which established a competitive grant program to help public housing authorities fight drug-related crime. When I asked you about this program during your confirmation process, you deferred any judgments about the funding of the program. Do you now support funding the program in FY 90 at $50 million or some other level?

ANSWER: No position has been taken at this time by the President on fiscal year 1990 funding for the Public Housing Drug Elimination Act.

SENATOR LAUTENBERG: Would you support a supplemental appropriation for the program of $8.2 million for FY 89?

ANSWER: The 1989 Supplemental Appropriations Act already has provided $8.2 million under Operating Subsidies for drug prevention activities in Public and Indian Housing projects.

DRUG ELIMINATION

SENATOR LAUTENBERG: I am concerned about reports that HUD will seek to address the drug problem in public housing exclusively through the operating subsidy and modernization programs. First, neither of these programs target assistance to PHA's with the greatest needs (as does the Public Housing Drug Elimination Act). Second, distributing funds only through the operating subsidy formula will not be as effective in encouraging the development of innovative anti-drug strategies as PHDEA's competitive distribution system. Also, the PHDEA encourages PHA's to work together with local government and local communities (local support is a factor in evaluating applications). There are no such formal incentives if funds are simply handed out under the Performance Funding System.

Nor, in my view, is the modernization program the best means of distributing anti-drug funding. CIAP has a $21 billion backlog and was not designed as an anti-drug program. The uses of CIAP funds are limited, and many PHA's are ineligible for funding. Also, many PHA's, particularly the smaller authorities, are ill-equipped to deal with the complex CIAP application procedures.

(a) Do you agree that PHDEA provides assistance to housing authorities in a manner that is better targeted to PHA's anti-drug needs than the operating subsidy and modernization programs?

(b) If Congress were to decide to spend $50 million on anti-drug efforts for public housing, would you support allocating that money to the Public Housing Drug Elimination Act program?

ANSWER: HUD believes that any additional funds to be made available to Public Housing Agencies (PHAs) and Indian Housing Authorities (IHAs) for use in anti-drug efforts should be allocated by a competitive process which takes into account the wide variations in local needs and issues. The Department will use the $8.2 million included in the 1989 Supplemental Appropriations Act to initially fund more intensive activities to make Public and Indian Housing projects drug-free. If more funds were made available in the FY 1990 Budget for drug elimination efforts we would continue to use the PHDEA language as long as the authorizing and appropriating language allowed us to do so. CIAP and Modernization funds are primarily for hardware applications. The attached Notice clarifies precise usage of funds. CDBG funds have been used to fund drug treatment centers in public housing for the last few years. A Notice was issued on April 27, 1989, describing the use of these funds in support of anti-drug programs in assisted housing. Other eligible activities are recreational programs for youth, day care programs, and increased law enforcement services for educational programs. PHDEA funds at this point and time are so limited that we are encouraging PHAs to meet such needs as capital improvement, security needs and other eligible activities through CIAP and CDBG.

U.S. Department of Housing and Urban Development
PUBLIC AND INDIAN HOUSING

Special Attention of:
Public Housing Agencies; Indian Housing Authorities; Regional Administrators; Regional Public Housing Directors; Field Office Managers; Housing Management Division Directors; Chiefs, Assisted Housing Management Branch; OIP Managers

Notice PIH 89-15 (PHA)

Issued: April 4, 1989
Expires: April 30, 1990

Cross References:
CIAP Handbook 7485.1 REV-3

Subject: Comprehensive Improvement Assistance Program (CIAP) - Use of CIAP Funds for Drug Elimination Activities

1. Purpose. This Notice provides additional guidance to Public Housing Agencies (PHAs) and Indian Housing Authorities (IHAs) on the eligible uses of CIAP funds in the effort to eliminate drugs in Public and Indian Housing. This Notice also explains how PHAs* selected for Joint Review during Fiscal Year (FY) 1989 may receive extra points in the improved habitability scoring after Joint Review for drug elimination activities.

2. Eligible Activities. Appendix 1 of this Notice sets forth the eligible uses of CIAP funds for drug elimination activities. These activities include physical improvements under special purpose, emergency, and comprehensive modernization, as well as management improvements under comprehensive modernization only. In addition, Appendix 1 explains the need for PHA coordination with local governmental strategies and programs to ensure that PHA efforts and funds are not wasted.

3. Improved Habitability Scoring.

   a. PHAs Selected for Joint Review. During FY 1989, any PHA selected for Joint Review may enhance its preliminary application by proposing drug elimination activities in accordance with Appendix 1. The PHA may propose such activities either at the time of Joint Review or before the end of the Joint Review period, even if such activities were not proposed in its preliminary application. Before the end of the Joint Review period established by each Regional Office, such a PHA shall submit to the Field Office a written explanation of how its proposed drug elimination activities relate to its own overall strategies and programs, including tenant support, as well as to local governmental strategies and programs.

   b. Additional Points. In scoring the improved habitability factors after Joint Review, the Field Office shall provide the maximum number of points on the factor, "Extent to which both physical and management needs are effectively addressed," for the PHA which is proposing eligible and justified drug elimination activities. In addition, the Field Office shall provide the maximum number of points on the factor, "Local government and tenant/homebuyer support," for the PHA which has provided a written letter of support from the local government and has demonstrated how the PHA's proposed activities will support local governmental efforts to eliminate drugs.

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* Unless otherwise noted, the use of "PHAs" refers to both PHAs and IHAs.

c. CIAP Application Processing System (CAPS). The Field Office shall identify projects with drug elimination activities in the "comments" section of the Preliminary Funding Decision screen of CAPS and shall classify projects with drug problems as meeting the statutory funding preference of Group 2C.

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Appendix 1

USE OF CIAP FUNDS FOR DRUG ELIMINATION ACTIVITIES

HUD strongly encourages all PHAs to take an active leadership role in eliminating illegal drugs from public housing projects. The use of "PHAs" refers to both PHAs and IHAs.

HUD recognizes that the elimination of drugs in public housing and the protection of public housing property require the cooperation of the local government and the provision of resources beyond that which are currently available to support the Public and Indian Housing Program.

The eligible uses of CIAP funds in the effort to achieve drug-free public housing include physical improvements under special purpose, emergency, and comprehensive modernization and management improvements under comprehensive modernization.

Physical Improvements

Under special purpose, emergency, and comprehensive modernization, eligible physical improvements related to eliminating drugs include: installation of security hardware and additional lighting; creation of defensible space through redesign of entrances; provision of fencing around the perimeter of the project; and conversion of a dwelling unit into nondwelling space for use by project management or tenant patrols. Under emergency modernization, a determination as to the eligibility of the physical improvement (i.e., correction of an imminent threat to tenant life, health and safety) must be made on an individual work item basis.

Management Improvements

Section 14 of the U.S. Housing Act of 1937, as amended, allows for the funding of "improvements needed to upgrade the management and operation" of each project being comprehensively modernized. Implementing regulations at 24 CFR 968.5(b) state that:

* Management improvements that are project specific or PHA-wide in nature are eligible modernization costs where they are necessary to correct identified management problems and to sustain the physical improvements at the project being modernized. This condition reflects the statutory intent that management improvements be in support of the physical improvements.

* Management improvements shall be fundable only for the implementation period of the physical improvements. In rare cases, HUD may approve a longer period, up to a maximum of five years, where it is clearly shown to be necessary to complete the initial installation and demonstrate that the management work item will bring about needed management improvements.

* Where management improvements involve ongoing costs, HUD is not obligated to provide continued funding or additional operating subsidy after the end of the implementation period. The PHA is responsible for finding other funding sources, reducing its ongoing management costs, or terminating the management activities.

Although the use of CIAP funds for management improvements involving drug-elimination activities has some limitations in the statute and regulations, there are activities which are eligible for CIAP funding and which, when coordinated with local government efforts, may contribute to the overall effort against drugs. Under comprehensive modernization, examples of eligible management improvements include:

* hiring of additional staff to coordinate the provision of appropriate social services, such as drug education and treatment referral programs, provided by local government or other public and private entities;

* hiring of security guards during the implementation period of the physical improvements or longer (not to exceed five years);

* development of more timely management techniques for dealing with disruptive tenants and drug-related crime;

* development and implementation of improved screening procedures for prospective tenants;

* organization of unarmed tenant patrols to report suspicious activity to local law enforcement agencies. (Note: purchase of nonexpendable equipment for tenant patrols is an eligible physical improvement cost); and

* development and implementation of improved communication and coordination with local law enforcement agencies.

Hiring of additional staff or use of existing staff to directly provide social services to the tenants of the project to be comprehensively modernized is an ineligible management improvement and, therefore, an ineligible CIAP expense. Examples of ineligible activities include:

* hiring of additional staff to provide directly social

services, such as drug education and treatment referral programs;

- provision of expendable materials and goods, such as "Just Say No" T-shirts, caps and buttons, to tenants; and
- development of drug education videos.

Under special purpose and emergency modernization, management improvements are ineligible for CIAP funding.

Local Government Cooperation and Other Public/Private Resources

Under the terms of the Cooperation Agreement between the local government and the PHA, the local government is responsible for providing the same level of services (police, fire, trash collection) to public housing as are provided to other neighborhoods. Although Federal funds provide primary support, public housing cannot be operated successfully without the involvement of the local government and local community.

Accordingly, CIAP-funded improvements related to drug elimination should not be funded in a vacuum without such local involvement. PHAs that wish to use CIAP funds for drug elimination activities should justify how the activities relate to their own programs, as well as to local strategies and programs for both project and neighborhood improvement. This justification and a letter from the local government explaining how the proposed PHA's activities fit into local strategies and programs should be provided by the end of the Joint Review period.

Since, nationally, modernization needs far exceed available funds, it is essential that all CIAP funds be used for activities that will have a long-term beneficial effect on the improvement of public housing.

ANTI-DRUG ENFORCEMENT PENALTIES

SENATOR LAUTENBERG: A task force of the National Association of Housing and Redevelopment Officials has recommended that drug dealing within 25 feet of a public housing project or in public housing be punishable as a federal offense. Do you agree with this recommendation?

ANSWER: The Department traditionally has allowed Public Housing Agencies (PHAs) the latitude to establish their own security methods for their individual needs, particularly in maintaining defensible space for the residents. If a PHA and the local police determine that a drug-free zone is needed around a Public Housing project, then it is up to the local authorities to establish one and to establish the appropriate penalties for those who violate it. The Anti-Drug Abuse Act of 1988 addressed this issue by requiring that the Public Housing lease provide for termination of tenancy where residents, a member of their family, or a guest should "engage in criminal activity, including drug-related criminal activity, on or near public housing premises..." (emphasis supplied).

SENATOR LAUTENBERG: How many PHA's have asked the Department to waive the HUD lease/grievance procedure to permit them to use ther own state process for tenant/landlard disputes? b. How many requests have been granted?

ANSWER: Initially, we received several requests from States and local jurisdictions, specifically: New York; Alexandria, VA; Boston, MA, and the District of Columbia. Following these requests, we decided to undertake review of the eviction laws of each State regardless of whether or not a request for such review had been made. Therefore, we saw no need to statistically monitor requests arriving from PHAs.

Section 404 of the Dire Emergency Supplemental Act, signed by the President on June 30, now requires the Secretary to seek tenant comment on the two due process requirements of State law before waiving HUD's lease and grievance procedures. Moreover, this section allows waiver of the time-consuming lease and greivance procedures only where the health or safety of the tenants is threatened and the eviction does not "effect the right of any other household member who is not involved in such activity to continue tenancy."

Prior to enactment of this significant shifts in the law the Secretary-granted waivers for 28 States plus the District of Columbia. Under the current law no reviews or determinations are being made.

Section 404 would be repealed under the 1990 House Appropriations bill which was reported out of Committee on July 17, 1989.

SENATOR LAUTENBERG: Many public housing authorities have expressed concern about the difficulty of evicting tenants who are engaged in illegal drug-related activities. To what extent are these difficulties a result of impediments created by State laws? Has HUD studied these State laws? Do you believe that the Federal interest in drug-free public housing warrants consideration of a Federal law to preempt State laws that create unreasonable barriers to eviction of drug dealers?

ANSWER: Information available to the Department indicates that difficulties in evicting tenants are often a result of problems in the State court systems and eviction procedures. We have not studied State laws for the purposes of determining whether there should be reforms in State eviction procedures. The Department believes that Federal eviction requirements do not preempt State eviction procedures and requirements for Federally subsidized programs unless there is specific conflict between a State law and a specific Federal requirement. At this time the Department believes that the Federal Government should seek to remove the unnecessary impediments to eviction that exist in the operation of Federal programs and requirements. However, eviction procedures generally are properly left to determination by State legislatures.

NONPROFIT HOUSING GROUPS

SENATOR LAUTENBERG: I know we share great enthusiasm about non-profit groups and their success in developing affordable housing throughout the country. As you may know, I am introducing legislation, the Community Housing Partnership Act, to help support and develop the nonprofit sector. The bill would provide matching grants and technical assistance to nonprofits that develop affordable housing. Please provide the number of nonprofit groups currently engaged in the development of affordable housing.

ANSWER: Information from a recent study by the National Congress for Community Economic Development, which was published in its report, Against All Odds: the Achievement of Community based Development Organizations (CBDOs), indicated that over 1,300 CBDOs were involved in affordable housing development. An operational CBDO was defined as a private, locally based non-profit organization committed to serving a low-income population (that is, people whose incomes are below 80 percent of the area median income). Moreover, to be included, a CBDO was ongoing, directly involved in development, with at least one project completed in housing, commercial/industrial or business enterprise development.

SENATOR LAUTENBERG: How many units have nonprofit groups already produced, and how many units are such groups producing annually?

ANSWER: The above study shows that 258,390 units of affordable housing were produced by CBDOs between 1981 and 1988. Production averages about 30,000 units per year.

SENATOR LAUTENBURG: Do you agree that nonprofit groups, because of their generally close ties to the community, are frequently able to produce housing in a manner that is uniquely sensitive to local community needs?

ANSWER: We are not able to comment on the "sensitivity" to local needs but the rapidly growing scale of affordable housing being sponsored by CBDOs is testimony to their ability to produce housing.

SENATOR LAUTENBURG: Do you agree that nonprofit groups are becoming increasingly competent to produce affordable housing in an efficient, cost-effective manner?

ANSWER: Their growing productivity may be evidence of increasing competence. Since 1980, CBDOs have been receiving increasing technical and financial assistance from a growing number of national, regional and local "intermediary" organizations such as the Local Initiatives Support Corporation, the Enterprise Foundation, the American Affordable Housing Institute, Community Development, Inc., the Council for Community-based Development, the Development Training Institute, the National Congress for Community Economic Development, Neighborhood Housing Services of America, and the National Training and Information Center, among others. There are now over 100 such groups, and many have received Federal funds.

SENATOR LAUTENBERG: Do you agree that many nonprofits would be better able to develop affordable housing if they had improved access to training and technical assistance?

ANSWER: As training and technical assistance becomes more available, CBDOs become more productive.

SENATOR LAUTENBERG: Do you agree that nonprofit groups could make a much greater contribution to eliminating homelessness and providing affordable housing if they had stronger financial support?

ANSWER: This would probably be the case.

SENATOR LAUTENBERG: Do you agree with the general concept of providing federal grants to nonprofits for the development of affordable housing, if the grants are conditioned on nonprofits matching these grants with funds from state, local and private sources?

ANSWER: Much affordable housing development is currently being jointly funded by Federal, State, local and private sources. The housing partnership movement is already well advanced and quite extensive. Dozens of public/private housing partnerships have already been formalized at both the State and local level.

PUBLIC HOUSING PRODUCTION

SENATOR LAUTENBERG: As you know, many regions of the country suffer from severe shortages of affordable housing. Yet the Department's budget relies entirely on 5 year vouchers and seems not to address those tight housing markets and the need to add to the supply of affordable housing. Why is there no housing production program or assistance proposed in the HUD FY90 budget?

ANSWER: The 1990 Budget proposes greater targeting of resources toward those most in need of assistance. For those areas experiencing shortages of rental housing, new construction and rehabilitation is provided through the Section 202 Housing for the Elderly or Handicapped program and the Rental Rehabilitation program. New construction is also proposed as an eligible component of the Community Development Block Grant. These programs, along with state and local efforts will help meet the rental housing needs of low-income families in those areas.

SENATOR LAUTENBERG: What would be the Department's position on devoting a modest amount of funds to the production of new scattered site public housing and some percentage of Sec. 8 funds to project-based assistance?

ANSWER: Such a proposal to combine Section 8 assistance with Public Housing development is not legally permissible. A prohibition against such a "piggybacking" of Section 8 and Public Housing is implicit in Section 8 authorizing legislation and expressly stated in Section 882.101(a)(2) of the Section 8 Existing Housing regulations.

PUBLIC AND INDIAN HOUSING MODERNIZATION

SENATOR LAUTENBERG: I am concerned about the amount of funding requested for the public housing modernization program in FY 90. According to the Abt report, there is a $21 billion backlog of modernization needs. Yet the request for FY 90 is $700 million less than the current fiscal year. Would it not make sense to increase funding for modernization so as to make more units habitable, reduce vacancies, and reduce the vandalism and crime that vacant units invite?

ANSWER: Projects which have 10 percent or more vacant or substandard units already have priority for funding under Section 14 of the U.S. Housing Act of 1937, as amended. In addition, the Department recently implemented the expanded eligibility of work under the category of special purpose modernization to include work related to fix-up of vacant units and security.

SENATOR LAUTENBERG: I understand that there is a $3 billion pipeline of modernization applications currently at HUD and many housing authorities have expressed frustration about the delays in distributing these funds. Is there anything you can do to help get these funds out to local authorities more quickly?

ANSWER: There is no backlog of modernization applications at HUD. Following the annual appropriation of funds for modernization, the Department invites Public Housing Agencies (PHAs) and Indian Housing Authorities (IHAs) to prepare and submit applications for Comprehensive Improvement Assistance. PHAs and IHAs apply annually for these competitive grant funds. HUD processes and approves or disapproves the applications by the end of each fiscal year. The entire process takes the full 12 months.

Thus, as of September 30, 1988, $3.2 billion of Modernization and Major Reconstruction funds which had been approved by HUD remained unobligated (contracts not awarded) by PHAs/IHAs. It should be noted that 55 percent of the unobligated amount represents funds that were made available for fiscal year 1988 and for which projects were approved during September 1988. The following table reflects the distribution of those funds by fiscal year of approval by HUD.

MODERNIZATION PIPELINE

FISCAL YEAR OF APPROVAL BY HUD	FUNDS UNOBLIGATED BY PHAs/IHAs AS OF 9/30/88 (In Millions)	PERCENT OF TOTAL FUNDS UNOBLIGATED
1984/Prior	$56.0	4%
1985	103.5	7%
1986	251.0 a/	17%
1987	1,054.7 a/	72%
Subtotal	1,465.2	
1988	1,778.8 a/ b/	100%
Total	3,244.0	

a/ Includes funds for major reconstruction of obsolete projects.

b/ Approved by HUD during September 1988.

The Department requires PHAs/IHAs to submit implementation schedules for each project approved for modernization. In general, HUD allows 1 year for PHAs/IHAs to obligate emergency modernization funds and 3 years for PHAs/IHAs to obligate all other modernization funds. As shown in the table above, 93 percent of the funds approved by HUD in fiscal year 1985 were obligated within the 3 year requirement. PHAs/IHAs which miss their fund obligation deadlines, as set forth in HUD-approved schedules, are subject to having their unobligated funds recaptured unless there are valid reasons for time extensions. Valid reasons include litigation, delays relating to the results of lead-based paint testing, and HUD or other agency delays.

The Department has taken the following steps to accelerate the obligation of funds by PHAs/IHAs:

--Placing greater emphasis on a PHA's/IHA's capability to perform modernization when approving funds;

--Improving financial control of the program by providing staged comprehensive funding (funding over several fiscal years) to PHAs with management improvements funded in the first stage. (Troubled PHAs are not eligible for single staged comprehensive modernization [complete funding in one fiscal year]);

--Requiring PHAs/IHAs to prepare "Project Implementation Schedules" setting forth key target dates for each approved modernization project. These schedules permit HUD to monitor whether implementation is progressing in a timely manner;

--Recapturing funds not obligated by the fund obligation deadlines set forth in the "Project Implementation Schedule" unless there are valid reasons for time extensions; and

--Including on-site monitoring visits of modernization projects as part of the Regional Management Plan goals. This focuses Field Office resources to ensure program inspections at least once a year (twice a year for Comprehensive Modernization).

In addition, the Department is considering implementing a new policy in fiscal year 1991 that would make PHAs/IHAs eligible only for emergency modernization funds if they do not have all funds expended by the deadline dates set forth in their project implementation schedules.

SENATOR LAUTENBERG: Section 119 of the 1987 Housing and Community Development Act requires HUD to submit to Congress no later Chan February 5, 1989 proposed methods for allocating funds among PHAs to modernization, including formulas for distributing funds at the HUD regional and field office levels, state levels and to PHAs. When will that report be submitted and what will it propose in terms of allocations and funding needs?

ANSWER: The report to Congress on Alternative Methods of Funding Public Housing Modernization, required by Section 119(f) of the HCD Act of 1987, is expected to be completed and transmitted to Congress in the fall. A first draft of the report has been completed and reviewed by representatives of PHAs and State and local governments, who presented their views at a meeting to discuss the alternative funding approaches set forth in the draft on June 27, 1989. A similar meeting is planned following HUD revisions to the report to reflect the discussion at the June 27 meeting. These meetings are part of the consultative process required by Section 119(f). The Department has not yet developed recommendations with respect to the most appropriate funding mechanism for the modernization program, or the desirable funding levels for modernization, nor has it determined the most appropriate method to transmit its recommendations to the Congress.

SENATOR LAUTENBERG: Does the Department plan to implement the Comp Grants program by October 1 of this year? If Congress does not act on the formula by that date, how does the Department propose to allocate funds?

ANSWER: No. The Department is working with interested parties (as required by statute) to develop alternative methods for funding modernization. Based on progress to date, it does not appear feasible to implement the Comprehensive Grant Program in fiscal year 1990. Once developed, Congress must approve the allocation formula. Following approval of the formula, HUD would issue a final rule, develop program forms and a handbook, and train HUD Field staff. Therefore, fiscal year 1990 funds would continue to be managed under the current Comprehensive Improvement Program (CIAP), but with some administrative simplifications, including a one-step application process.

SENATOR LAUTENBERG: Congress also mandated a report on how CIAP funds have been allocated. What is the status of that report? When will it be released and what findings have materialized?

ANSWER: The report has been included in the 1988 HUD Annual Report which is being typeset. We can not yet determine when it will be released. The report shows that the total modernization needs of Public Housing Agencies (PHAs) is approximately $9 billion based on the Comprehensive Plans for Modernization (CPMs) that have been received. This estimate only includes the needs of PHAs that have submitted CPMs or that have approved CPMs. We have not received CMPs from 36 PHAs, including many large ones such as the Chicago Housing Authority, which is one of the nation's largest and has major operating problems.

OPERATING SUBSIDIES

SENATOR LAUTENBERG: The Performance Funding System formula for public housing operating subsidies for the current fiscal year has identified a shortfall of approximately $34 million, exclusive of unanticipated insurance costs. What steps is the Department taking to improve the forecasting accuracy of PFS so as to avoid future needs for supplemental appropriations?

ANSWER: The fiscal year 1989 Budget assumed savings based on improved tenant income recertification/verification activities and on a proposed legislative change to permit waiver of the rent rules for Public Housing Agencies (PHAs) and Indian Housing Authorities (IHAs) electing to forego Operating Subsidies. Savings in these two areas have not been realized in fiscal year 1989. The forecasting accuracy of the model used to produce Performance Funding System (PFS) estimates is good. No model, however, can account for unexpected changes in implementation dates, legislative action, or utility rates.

SENATOR LAUTENBERG: Does the PFS formula and/or the Department's FY 90 budget request for operating subsidies take into account unanticipated insurance costs that PHA's have experienced during the past two years? What is the total dollar amount of unfunded insurance costs for fiscal 1987 and 1988?

ANSWER: The fiscal year 1990 Budget request for Operating Subsidies does not include an amount for unfunded insurance costs for fiscal years 1987 and 1988. The Department, however, did distribute

$124,086,952 and $64,990,692 during fiscal years 1987 and 1988, respectively, to PHAs/IHAs for increased insurance costs.

The fiscal year 1990 Budget request includes $132.7 million to cover the additional subsidy requirements which have been incorporated in fiscal year 1989 into each PHA's/IHA's Allowable Expense Level (AEL) which is used to compute the Operating Subsidy eligibility.

The level of subsidization incorporated in fiscal year 1989, when combined with the subsidy previously provided and adjusted for inflation, should equal or be greater than most PHAs/IHAs actual insurance costs. This is based on an initial review of actual insurance cost data for the period ending June 30, 1987 (PHAs/IHAs with fiscal years ending September 30, 1986, December 31, 1986, March 31, 1987 and June 30, 1987) and June 30, 1988 (PHAs/IHAs with fiscal years ending September 30, 1987, December 31, 1987, March 31, 1988, and June 30, 1988).

SENATOR LAUTENBERG: In response to questions I submitted to you in January concerning the status of HUD's role to address radon in Federal housing, you said you would review HUD's radon effort and its priority within HUD and pledged HUD's cooperation in meeting its statutory responsibilities.

a) Have you conducted this review?
b) What did you conclude?
c) What efforts do you plan to take to fulfill your pledge to have HUD meet its statutory responsibilities?

ANSWER: The Department reviewed its role in addressing radon. For assisted housing, under the Stewart B. McKinney Homeless Assistance Act Amendments of 1988, HUD established a Radon Policy Group at the Deputy Assistant Secretary level to provide policy direction to implement the requirements of the Act. A Staff Support Group was also formed to perform any required studies and analyses. The Policy Group developed draft policy alternatives covering education, research, testing and mitigation.

Our conclusions thus far are: (1) The five housing programs listed in the Act cover about 2.8 million dwelling units. Approximately 1.5 million of these units are located on the ground floor which are most prone to radon entry. The dwelling units are administered by over 3,000 Public and Indian Housing Authorities and 16,000 private owners. The numbers and types of units covered and the variety of ownership patterns complicate the problem and will require that multiple options be considered and evaluated. (2) HUD's activities involving education and research are consistent with similar efforts covering all housing in the U.S. These activities are being accomplished in cooperation with the Environmental Protection Agency (EPA), as covered in the Memorandum of Understanding between the two agencies. (3) The testing and mitigation options are much more complex and will need to be tailored to the individual housing programs. First, the relationship between the owner and tenant is different for Public and Indian Housing programs than for other programs where the assistance is in privately owned buildings. Second, the types of units and buildings could vary significantly, and an affected unit in a private building may be only one of several units in the building.

The Department is proceeding to carry out its statutory obligation in a responsible manner. Single family construction and rehabilitation should be covered by model codes developed pursuant to the 1988 Indoor Radon Abatement Act. The Department is cooperating with EPA on this issue. Other actions that have been taken or are underway are presented in detail in the response to the specific question on the McKinney Act requirements.

SENATOR LAUTENBERG: What is the status of your efforts to implement the provisions of the McKinney Homeless bill regarding your radon program?

ANSWER: In addition to its role in developing and assessing various policy options for dealing with radon in the five programs under the McKinney Act Amendments, the Radon Policy Group provided direction to the Work Group in the development of a Memorandum of Understanding (MOU) with the EPA regarding the respective roles of the two agencies on radon. The MOU was reviewed and approved by legal counsel and the Policy Group, and was signed for the Department by the Assistant Secretary for Community Planning and Development on March 28, 1989. It was forwarded to the EPA Assistant Administrator for Air and Radiation Programs. The EPA radon staff had participated in the development of the MOU and recommended that it be signed; however, a new Assistant Administrator has since been appointed, and his signature on the MOU is expected shortly.

The MOU establishes a mechanism for coordination in accordance with the mandates set forth in Section 403 of the Radon Gas and Indoor Air Quality Research Act of 1986, the 1988 Amendment to the Toxic Substances Control Act which added Title III on Indoor Radon Abatement, as well as the McKinney Homeless Assistance Act Amendments adding Section 1091, Report on Recommended Policy for Dealing with Radon in Assisted Housing.

The Department has allocated research funds in fiscal 1989 specifically to address McKinney Act requirements. Negotiations are underway for an interagency agreement with EPA to initiate a joint project to test radon levels on each floor of multistory buildings to learn how radon is dissipated throughout the building. Buildings tested would need to include various types of construction and heating and ventilating systems. The results of the research will be used as a preliminary indication of the scope of housing units to be considered in the Department's radon policy. This research is needed to supplement EPA's experience with radon in single family dwellings and, more recently, in schools. The joint effort is consistent with the MOU and the research program required under the 1986 Radon Gas and Indoor Air Quality Research Act.

The Department is also continuing to support the Committee on Interagency Radiation Research and Policy Coordination by providing $50,000 in CPD contract funds this year to continue its interagency coordination role in radon research.

SENATOR LAUTENBERG: The 1986 Radon Gas and Indoor Air Quality Research Act also calls on HUD to play a role to address indoor air pollution. What efforts have you made to implement this requirement?

ANSWER: Title IV of the Superfund Amendments and Reauthorization Act of 1986, in Section 403(b)(5), requires that the EPA Administrator carry on certain research in conjunction with the Department of Housing and Urban Development relating to radon and indoor air quality.

The Department continues to play an active role in the Interagency Committee on Indoor Air Quality and its Radon Subcommittee, both of which now meet on a regular basis. The Department is also participating with other agencies and groups in the development of construction standards and techniques under Section 304 of the Indoor Radon Abatement Act.

The National Institute of Standards and Technology has completed a preliminary research study, funded by the Department, on the development of a site test for presence of radon and the potential for radon entry into buildings. The Department is now reviewing a draft of the final report in consultation with U. S. Geological Survey staff.

The Department also provided research funds to the National Association of Home Builders for the preparation of a guide entitled, "Asbestos Handbook for Remodeling" which was published earlier this year.

QUESTIONS SUBMITTED BY SENATOR J. ROBERT KERREY

Senator Kerrey: On several occasions you have cited the Omaha Housing Authority and its director, Bob Armstrong. We are proud of their achievements, of the services support and sense of community which exist there. They are expecting a visit from you - (they had, I believe, some indication from your staff that it would be in June) - so my first question is, "when are you going to Omaha?

Answer: I have been impressed by the efforts of Bob Armstrong, the dynamic Executive Director of the Omaha Public Housing Authority, to provide decent, affordable, drug-free housing for low-income families in Omaha. Although I don't have any trips to Omaha scheduled at this time, I look forward to visiting there sometime in the future.

SENATOR KERREY: How many entitlement cities are there? How many of these have been added since 1980? How many new ones do you expect in FY 1990?

ANSWER: In 1980 there were 658 metropolitan cities and urban counties. In 1989 this has increased to 843. A further increase to 858 is expected for 1990.

SENATOR KERREY: When the number of entitlement cities increases and appropriations decrease or remain static, the per city allotment dwindles. For example, in 1980, Omaha received $5.9 million in CDBG funds; in 1988 it received $3.7 million. Do you believe entitlement cities can continue effective programs with continuously diminishing funds?

ANSWER: The "diminishing" funding available to CDBG communities recognizes the fiscal realities of the Federal budget deficit. However, our grantees have had a good deal of success in attracting other resources to meet their community development needs. Each year, more income is being generated by the Community Development Block Grant program. This income is being used to expand local program activity levels. In 1986, for example, nearly $485 million in program income was put to use in local projects.

SENATOR KERREY: Originally, CDBG funds were quite limited in their use. More recently, however, they have been used for a greater variety of activities, including housing and social services. Some observers have suggested that CDBG has come to be the principal grant for cities and has substituted for the elimination of other grants.

What do you think CDBG should do? What role do you see it playing during your tenure as Secretary?

ANSWER: I will not presume to impose my judgement regarding the choice of activities to be undertaken by our grantees. These are local decisions. However, I believe the Congressional mandate that the program benefit the poor must be reinforced with clear regulations, and vigorous oversight by HUD. The intended beneficiaries of the Community Development Block Grant program deserve to have the doors to economic opportunity opened, to have their neighborhoods physically improved, to have a secure environment, and to receive the services they need from local government.

SENATOR KERREY: Section 509 of the 1987 Housing Community Development Act requires relocation/affordability support when persons are displaced by CDBG projects. Has the Department estimated the cost to CDBG recipients of the relocation/affordability support and if so, what is it? If not, are you going to estimate it? Has the Department estimated how many units of special set-aside may be necessary under Section 8 for this purpose?

ANSWER: The "residential anti-displacement and relocation plan" called for by the statute includes two significantly different components. One of these requires the replacement of certain low- and moderate-income housing demolished or converted to another use (sections (104(d)(2)A)(i) and (ii)). The other component requires that relocation assistance, including the relocation of displacees into comparable replacement housing, be provided to low- and moderate-income occupants who are displaced by demolition or by the conversion of low- and moderate-income housing to another use (sections 104(d)(2)(A)(iii) and (iv)).

The Department has not estimated the cost of these requirements to grantees and has no plans to conduct a detailed survey. It would be very difficult to measure the cost of the replacement unit requirement since the major effect of the requirement is to change the "mix" of federally assisted community development and housing activities that are feasible. For example, one difficulty in measuring the impact of the changes is measuring the negative impact on programs that arrest the loss of housing through abandonment.

With respect to displacement, the new section 104(d) requirements provide greater levels of relocation assistance to certain low- and moderate-income persons than is provided under the new amendments to the Uniform Relocation Assistance Act (URA) and the Real Property Acquisition Policies Act of 1970 (The URA governs all displacements as a direct result of acquisition, rehabilitation, or demolition for Federal or federally-assisted project.) To the extent that Section 8 certificates or vouchers are available, the increased cost of relocation assistance (above the URA) is less than $1,000 per family. Whenever a Section 8 certificate/voucher is not available, the average, increased cost would approximate $7,000 per household.

We do not believe it is advisable to provide a special set-aside of Section 8 assistance for grantees to meet the section 104(d) requirements. Available Section 8 assistance is limited and subject to many existing preferences. A set-aside for section 104(d) purposes would, of course, limit the amount of Section 8 assistance available to others and provide an incentive for grantees to carry out displacement-causing demolition and conversion.

SENATOR KERREY: How many applications has the Department received for CDBG funds to establish 911 Emergency Telephone Service? How many for public housing child care grants? How many for housing rehabilitation (# of units)?

ANSWER: While about a dozen groups expressed interest in this procedure, including some State and local governments, we know of no pending requests to use block grant funds for 911 service.

With regard to public housing child care grants, administered by our Office of Public and Indian Housing, 136 nonprofit organizations applied for the $5 million appropriated in 1988. The Department announced, in November 1988, that 57 of these organizations would receive grants. The notice, announcing the availability of the $5 million appropriated in 1989, was published July 14, 1989, in the Federal Register.

Finally, we expect 1988 funding for CDBG rehabilitation to result in over 60,000 units of rehabilitated housing. We do not yet have estimates from the use of the 1989 appropriation.

SENATOR KERREY: How many States currently administer the small cities part of the program?

ANSWER: The States of Hawaii and New York are the only ones not administering the small cities block grants.

DRUG FREE PUBLIC AND INDIAN HOUSING

SENATOR KERREY: You have been involved in the Administration's drug program and you indicate in your statement that you have sought the cooperation of the 3,000 public housing authorities in "this war on drugs." That "war," in my opinion, cuts across various needs - education, housing, health care, recreation support services. Yet, by their authorization and purpose, most HUD programs are focused, limited.

The Omaha Housing Authority and several others have indicated that they could do more to combat drugs and poverty if they had some type of integrated or comprehensive grant under which they could choose, they could contract and they could be responsible for support services which are generally needed along with housing. Do you have any opinion on this?

ANSWER: Comprehensive Improvement Assistance Program funds available for management improvement as well as Public Housing Agency/Indian Housing Authority operating funds can be used to coordinate supportive services such as counseling, job training and sports activities. In addition, other Departments such as Health and Human Services have sizeable programs which can provide direct funding of such activities.

SENATOR KERREY: Is there anything HUD can do to foster a more comprehensive approach to meeting these problems?

ANSWER: HUD already is working to foster a more comprehensive approach to meeting these problems. An Interagency Working Group comprised of representatives of the Departments of Agriculture, Education, Health and Human Services, Labor and the Office of Management and Budget has been established to assist HUD in marshalling supportive services to combat the use of drugs in Public and Indian Housing. This includes job training, economic development, youth activities such as Boys/Girls Clubs as well as other community based services.

Also, a Notice was issued on April 27, 1989 describing the use of Community Development Block Grant (CDBG) funds in support of drug programs in assisted housing. Some examples of eligible activities for which communities can use CDBG funds include educational programs related to drug abuse for residents, drug rehabilitation and counseling programs for affected residents, recreational programs for youth and young adults, and day care and after-school care programs for children of working parents.

SENATOR KERREY: To what extent can HUD make available facilities, personnel for support?

ANSWER: HUD itself does not make facilities or personnel available for direct support other than dissemination of information. The Department strongly encourages Public Housing Agencies (PHAs) and Indian Housing Authorities (IHAs) to take an active leadership role in that concern. To help facilitate the PHAs/IHAs in providing supportive services against drug use and abuse, the Department published a Notice on April 4, 1989 on "Use of Comprehensive Improvement Assistance Program (CIAP) Funds for Drug Elimination Activities." As the Notice indicated, there are management improvement activities that are eligible for CIAP funding and which, when coordinated with local government efforts, may contribute to the overall war against drugs. Under comprehensive modernization, examples of eligible management improvements include the hiring of additional staff to coordinate the provision of appropriate social services such as drug education and treatment referral programs to be provided by local governments or other public and private organizations.

SENATOR KERREY: You have talked about a number of initiatives which can be taken to combat drug use in public housing--police sweeps of targetted housing, photo I.D.'s for public housing residents, securing building entrances, installation of security devices, removal of graffiti, improvement of public areas, better housing code enforcement, etc. What are your estimates of the cost of these initiatives and what is the basis for the estimates?

ANSWER: The Department has not developed cost estimates of the total amount needed for anti-drug abuse activity in Public Housing. However, very substantial amounts currently are being spent on such activities from Operating Subsidy and Comprehensive Improvement Assistance Program (CIAP) funds.

Taking Public Housing projects away from drug-traffickers and returning the projects to law-abiding residents, is being skillfully executed by the Chicago Housing Authority. During "Operation Clean Sweep," that PHA has secured several high-crime, high-drug buildings and returned them to the control of the residents. The cost of securing one building, issuing photo ID's for residents, installing security devices, removing graffiti, improving public areas, etc. is estimated to be about $300,000. For similar operations performed elsewhere, the cost ultimately will be determined by the specific needs identified, local government officials, and their contractors.

SENATOR KERREY: It has been suggested that these funds will come from operating subsidies or modernization funds--is that your plan both for the short-term and for FY 90 in its entirety?

ANSWER: Approximately $80 million currently is spent on security annually by Public Housing Agencies (PHAs) and Indian Housing Authorities (IHAs) from Operating Subsidies. Expenses in this category include project police, guards, watchmen, uniforms, electronic detection equipment and devices, alarm systems, communica-tions equipment, and vehicles; and contracts with tenant organizations, municipal entities, and private security services for protective services. In 1988 and 1989, because of the seriousness and widespread proliferation of drug abuse, it is reasonable to assume that a very substantial portion of these funds have been used to deal specifically with the drug problem. The only available sources of current HUD funding for drug elimination efforts in Public and Indian Housing have been provided from Operating Subsidy and Modernizatiion funds. However, the 1989 Supplemental Appropriations Act includes $8.2 million for the Public and Indian Housing Drug Elimination Pilot Program.

SENATOR KERREY: Both operating subsidies and modernization funds are limited--aren't we robbing the wrong funds here?

ANSWER: Funds are not being taken from PHAs/IHAs, but are being targetted where PHA/IHA officials feel they will do the most good. Moreover, HUD is not the sole source of funds to fight drugs in Public and Indian Housing. The real solution is to be found with the community, residents, local police and officials all working together and pooling their resources. Some of the greatest stories from the war on drugs in Public Housing has come from the residents themselves who have been banding together to bring a stop to illegal drug activity in their projects. Everyone realizes that alternative resources must be found in times of austere budgets and that, fortunately, is occurring in many places.

SENATOR KERREY: Do you anticipate a separate request for funding for any drug initiatives?

ANSWER: The Department will be able to initially fund more intensive activities to make Public and Indian Housing projects drug-free with the $8.2 million recently included under Operating Subsidies in the 1989 Supplemental Appropriations Act.

LEASE/GRIEVANCE PROCEDURES

SENATOR KERREY: Several housing authorities have been critical of your lease/grievance procedures, complaining that it is currently difficult to evict for drug use without putting other tenants at risk. What are you planning for lease/grievance procedures?

ANSWER: The Department currently is evaluating the eviction laws of all the States to determine if they satisfy due process requirements. Where they do, the Secretary will make the announcement. Public Housing Agencies (PHAs) and Indian Housing Authorities (IHAs) then will be able to terminate tenancy without providing for a grievance hearing.

SENATOR KERRY: When do you expect new procedures to be in place?

ANSWER: This procedure was implemented on May 16, 1989 when the Secretary gave instructions to the Regional and Field Counsels. State eviction laws are being evaluated now. Shortly, the PHAs/IHAs in States with laws that provide for due process will be able to terminate tenancy without having to provide a grievance hearing.

URBAN/RURAL

SENATOR KERREY: You are Secretary of Housing and Urban Development. I have two metropolitan areas in my state, two CDBG entitlement cities if you will. But, I also have more than 100 housing authorities, some quite small; I have great competition for small cities grants; FHA insurance is extremely important in our more rural areas.

a. So - a somewhat philosophical questions - what is your definition of urban; b. what do you see as your role in less urbanized area; will you seek to expand housing opportunities wherever they may be needed.

ANSWER: The Census Bureau divides the country into urban and rural areas. Urban areas are essentially cities or villages of 2,500 or more inhabitants, while rural areas are those not classified as urban.

OMB defines metro areas as counties or groups of contiguous counties that share certain social and economic characteristics and contain a central city (or two contiguous cities) with a population of 50,000 or more persons. Non-metro areas are counties that contain no city of 50,000 or more persons and that are not part of a metro area.

FmHA programs serve all rural areas, including those in metropolitan and non-metropolitan areas. FmHA programs also serve some urban areas, for example cities of between 2,500 and 10,000 persons are routinely covered by FmHA. The extent of FmHA coverage in urban areas varies by State.

HUD programs serve all areas of the country, metropolitan and non-metropolitan, urban and rural. There is generally less coverage in rural areas under the unsubsidized (e.g., mortgage credit) programs. In addition, there are sometimes exclusions (e.g., there is a legislative proposal to remove a restriction on the Rental Rehabilitation program, so that it can serve rural as well as urban areas). In HUD programs there is often a requirement regarding the percentage of funds that must be spent in non-metropolitan areas. In the case of the assisted housing programs, for example, Section 213(d)(2) of the HCD Act of 1974 requires fund allocation based on 20 to 25 percent of the total going to non-metropolitan areas.

SENATOR KERREY: HUD is authorized to designate 100 cities under the Enterprise Zone program. I understand that more than 270 applications have been submitted. In your statement, you refer to working with Congress "in the next few months" to develop the most effective enterprise legislation possible and you refer to the tax legislation (S. 58 and H.R. 6).

What is your timeframe - when do you expect applications to be approved?

Are you confident that submitted applicants won't be affected/prejudiced by new legislation - could some applications look better after the tax legislation is passed?

Would you expect that modifications would be necessary for these applications?

ANSWER: Application approvals will depend on the timing of new legislation. A revised Enterprise Zone program will require developing and publishing of new regulations, outreach to potential applicants, time to submit designation requests, and time to review them. Based on our Title VII experience, it would take 6 to 9 months from passage of the legislation to designation of Zones.

The impact on applicants will depend on the details of the legislation. Title VII specified that designation would be based entirely on the rank order of distress. HUD prefers a competitive process which takes into account the strength and quality of the local strategy for dealing with problems in the area including reduction/elimination of taxes, rates and fees, cutting red tape, and linkages to job training.

If this approach is included in new legislation, these new factors will be included in the application requirements and new submissions will be required. However, since in most cases, the applicant will be dealing with the same area, much of the information will be germane. Also, a number of Title VII applicants have indicated that developing a local strategy for dealing with problems was valuable, in and of itself. This strategy will presumably be the core of any new submission, updated appropriately.

SENATOR KERREY: There have been suggestions that enterprise zones don't actually create jobs, that instead they just transfer them from one area to another. Do you agree with that assessment? What do you believe are the elements of a viable enterprise zone?

ANSWER: I do not agree with the "assessment" that Enterprise Zones only transfer jobs from one area to another. Enterprise Zones focus on providing entrepreneurship and job opportunities to Zone residents.

The most important element of a viable Enterprise Zone is the local commitment to its success. A public/private partnership must be created to provide entrepreneurship opportunities for those who have not been in the economic mainstream.

OPERATING SUBSIDIES

SENATOR KERREY: How is the performance funding system (PFS) payment currently calculated?

ANSWER: Under the PFS, HUD sets a formula-determined Allowable Expense Level (AEL) for each Public Housing Agency (PHA) and Indian Housing Authority (IHA) and separately computes utility and Independent Audit (IA) costs. Each PHA's/IHA's income also is projected and the subsidy is the difference between the projected expenses and projected operating income.

SENATOR KERREY: What percent of the PFS requirement will the requested funding cover?

ANSWER: The funds requested for fiscal year 1990 are estimated to cover 100 percent of the PFS requirement.

ASSISTED HOUSING POPULATION

SENATOR KERREY: How many persons are currently served by HUD assisted housing programs?

ANSWER: The number of units under payment as of September 30, 1988 was 4.2 million units. Based on the data included in the American Housing Survey (AHS), it is estimated that these units serve 9.4 million persons.

SENATOR KERREY: What are the income requirements and other eligibility criteria?

ANSWER: Annual income is determined as the gross income the owner and public housing agencies(PHAs) estimate the household will receive during the 12 months following the effective date of the certification or recertification. Annual income includes imputed income from assets, lump-sum income, income from business, alimony and child support, public assistance income, income of temporarily absent family members, income of persons permanently confined to a hospital or nursing home, and earned income tax credits.

The annual income less the following allowances constitute adjusted income: allowance for dependents, allowance for child care expenses, allowance for handicap assistance expenses, and allowance for medical expenses.

Applicants for subsidized housing must meet the economic eligibility criteria of the program, the uniform tenant selection criteria of the project, and the Federal preference requirements, i.e., income, expenses, assets, household characteristic, and circumstances that affect eligibility or tenant rent.

SENATOR KERREY: How many persons are on waiting lists for assisted housing? What is the average length of time a person must wait for housing? Does the length of time vary from area to area?

ANSWER: We have no available information regarding the number of individuals on waiting lists for assisted housing; nor do we have available information regarding the length of time a person must wait for housing. Such information is maintained by the project owners and PHAs. The length of the waiting list is affected by the area in which the project or tenant-based programs are located, the size of eligible population in the area, the number of available units in the area, etc. However, as a result of conversations with the housing industry, PHAs and the Field Offices, it appears that many projects and some PHAs have waiting periods from 1 year up to 3 years. In addition, the majority of PHA project waiting lists are closed because of their length.

SENATOR KERREY: Who is eligible for the "preference list" for housing assistance and approximately how many persons are on it?

ANSWER: The rule implements a statutory directive to give preference in the provision of housing assistance to families eligible for assistance under the Public and Indian Housing, Section 8, or Rent Supplement programs, that are living in substandard housing, that are involuntarily displaced, or that are paying more than 50 percent of family income for rent. This rule helps to ensure that housing assistance under these programs is directed to those with the greatest housing needs.

There is no information available that would indicate the number of individuals and/or families on the preference lists.

SENATOR KERREY: Do you have any figures on how many people move out of assisted housing each year because they have become self-sufficient? Do you have figures on how long people generally remain in assisted housing?

ANSWER: Based on a Public Housing study, every indication is that a tenant remains in a project over 10 years. However, a tenant is more likely to leave a project in 6 months than a tenant is to leave a project after 3 or 5 years. In addition, waiting lists for assisted projects indicate that it takes an applicant upwards of

3 years to be offered a unit. The aforementioned, and the fact the 60 percent of the project tenants are elderly, and elderly tenants rarely increase their incomes to become self-sufficient, one would assume that such a move is rare. In addition, many families move for more space, or to live in newer surroundings, or closer to relatives, etc.

SENATOR KERREY: What portion of the population served by assisted housing have an income of 50 percent of median income or less? Do those in public housing projects tend to have lower incomes than those in Section 8?

ANSWER: According to data from the 1987 American Housing Survey (AHS), 80 percent of respondents who said they lived in publicly owned or assisted housing had family incomes that fell below 50 percent of local median incomes when adjusted for family size. The AHS data cannot be used to distinguish accurately between those in public housing projects and those receiving other assistance such as Section 8, since a much larger number of respondents claim to live in publicly owned housing than could, in fact, be the case. In 1979, other data on occupants of assisted housing programs suggested that incomes were somewhat higher among those living in Section 8 new construction than among residents of either public housing or Section 8 existing units.

SENATOR KERREY: I have seen figures suggesting that a large portion of those in assisted housing are currently spending 50 percent of their income for housing. Do you have data on how many are spending 50 percent or more on housing? How many are spending more than 30 percent?

ANSWER: According to the 1987 AHS, 1 million of the 4.3 million households in assisted housing reported rents that were 50 percent or more of the income they reported. An additional 1.1 million households reported rents that were 30 to 50 percent of their income. Unfortunately, however, these numbers do not necessarily reflect the amounts spent on rent by these households, since the AHS question asks for the contract rent on the unit without specifically asking who pays it. Thus in cases such as Section 8 existing units where some of the total rent is paid by a rental supplement, the AHS respondent might well report the market rent for the unit rather than the amount he or she paid.

PUBLIC HOUSING INVENTORY

SENATOR KERREY: How many Public Housing units are there currently and what is the average age?

ANSWER: As of May 31, 1989, there were 1,314,358 Public Housing Agency-owned units under management. Their average age is 18.7 years.

VACANCIES

SENATOR KERREY: Approximately how many units are vacant and uninhabitable?

ANSWER: As of September 30, 1988, there were approximately 79,000 vacant Public Housing units out of a total of 1,309,946 PHA-owned units under management which is 6 percent of the total. No data are available indicating the number that are uninhabitable.

SENATOR KERREY: What is your estimate of the current backlog of modernization needs and what is the basis for your estimate?

ANSWER: Two studies funded by HUD, The Modernization Needs Study: National, Regional and Field Office Estimates: Backlog of Modernization Needs, (Abt Associates, 1988) and The Future Accrual of Capital Repair and Replacement Needs of Public Housing (ICF, Inc., 1989) present cost estimates for a number of different categories of modernization activity. The decision about which of these categories of modernization activity should be included in the definition of the backlog of modernization need for Federal funding purposes will be influenced by their budgetary and policy implications. In 1988, concurrently with the first of these reports, the Reagan Administration issued a policy paper which recommended that Federal funding responsibility for modernization be limited to mandatory modernziation work, that is, repairs and replacement to current building components, mandatory adds, lead-based paint abatement, and work required to make public housing accessible to the handicapped.

The full list of categories of modernization activity and the unfunded modernization need associated with each follows. The first four items below relate to the 1988 Administration policy paper recommendations.

- $12.15 billion for repairs and replacements (FIX) on the current physical components of public housing developments;
- $.55 billion for additions and upgrades (Mandatory Adds ISO 1&2) to meet HUD mandatory standards and State and local code requirements;
- $.36 billion for lead-based paint abatement;
- $.30 billion for work needed to make public housing projects and units accessible to the handicapped;
- $5.89 billion for additions and upgrades to improve project livability and marketability (Project Specific Adds ISO 1&2);
- $2.39 billion for redesign and reconfiguration activities to improve long-term project viability (Redesign); and
- $.63 billion for energy conservation activities.

These estimates assume 1990 dollar costs, and are for the public housing program only. They do not include the 1990 estimated needs for the Indian housing program. They are derived from the estimates of the backlog of modernization need presented in the ICF report mentioned above. The updated ICF estimates of unfunded modernization need, which reflect "hard costs" only, have been increased by 11 percent to include "soft costs," various administrative and planning costs including management improvements which are currently eligible for funding under the CIAP program. The amount of this adjustment for soft costs was based on information from HUD's Modernization Approvals Data System.

MODERNIZATION

SENATOR KERREY: How much currently exists in unobligated modernization balances?

ANSWER: As of September 30, 1988, $3.2 billion of Modernization funds that had been approved by HUD remained unobligated by Public Housing Agencies (PHAs) and Indian Housing Authorities (IHAs). However, this includes $1.7 billion (55 percent of the total) which were made available for fiscal year 1988 for projects that were approved for funding during September 1988.

SENATOR KERREY: What are your plans for use of the unobligated balances--will they be recaptured and reallocated?

ANSWER: The Department's policy, which has been in effect since 1985, is that unobligated funds over 1-year old for emergency modernization or over 3-years old for other modernization types are subject to recapture unless there is a valid reason for a time extension. Valid reasons include litigation, HUD or other institutional delays, or other delays outside of a PHA's/IHA's control such as hidden construction conditions, bids coming in over budget, et cetera. The appropriation act for each fiscal year specifies if recaptured funds will be rescinded or reused. Currently, the Act requires rescission.

SENATOR KERREY: What criteria do you use for allocating funds to the regions?

ANSWER: In fiscal year 1989, a weighted formula was used to allocate funds to the Regional Offices based on 75 percent of the need included in the Abt Study and 25 percent of the need included in the Perkins & Will study. No decision has been made at this time regarding the fiscal year 1990 allocation formula.

SENATOR KERREY: How are modernization funds suballocated to area offices?

ANSWER: Regional Offices use various methods of establishing funding targets for Field Offices. Such methods may include the percentage of units, relative age of units, amount of unobligated funds, and need for emergency modernization or funds to complete previously approved, staged comprehensive modernization, and an approved modernization plan.

INDIAN HOUSING NEEDS, INVENTORY, BUDGET REQUEST

SENATOR KERREY: What is the current need for Indian Housing and what is the basis for your figure?

ANSWER: The Bureau of Indian Affairs (BIA) Consolidated Housing Inventory for Fiscal Year 1988 shows that 62,138 additional housing units are required and 36,643 existing housing units need renovation for a total of 98,781 units. This number has increased by 5,811 units from the FY 1987 total. These requirements are based on Federally recognized tribal members residing on reservations, but exclude Indians living off the reservations both nearby and in distant areas who could be expected to return to the reservations if housing were available.

The data are based upon a reservation-by-reservation survey conducted by the BIA that counts only members of Federally recognized Indian tribes. Each BIA superintendent compiles the data which then are consolidated into a national total. The inventory does not separate existing housing units in need of renovation into HUD assisted or non-HUD assisted units. However, the HUD-assisted Indian Housing program serves Indians and Alaska Natives that are recognized by an Indian tribe, the Federal Government or any State. Therefore, the housing need could be much larger if the total population eligible for HUD-assisted Indian Housing were considered.

SENATOR KERREY: How many units of Indian public housing are there?

ANSWER: As of September 30, 1988, there were 61,954 Indian Housing Authority-owned units under management.

SENATOR KERREY: Why is there no FY 1990 request for Indian housing?

ANSWER: Indian Housing annual development needs currently can be met by utilizing the units already in the development pipeline. There were 8,911 units in the Indian Housing development pipeline at the start of 1989. In addition, an estimated 1,396 units will be reserved and added to the development pipeline in 1989.

LOSS OF UNITS

SENATOR KERREY: In the next few years, HUD faces the possibility of a loss of units from contract expirations, loan expirations, opt-outs, etc. Please provide figures, by types of programs, of the number of units which could be lost in each of the next five fiscal years under (a) a worst case scenario and (b) a scenario you view as more realistic.

ANSWER: The "worst case" and "most likely" scenarios under which housing units may be lost is presented below for contract expirations, prepayment and opt-outs.

Contract Expirations. The 1990 Budget assumed that subsidy contract expirations would occur at the rate shown in the following table:

Section 8 Subsidy Contract Expirations

(Number of Units)

	1989	1990	1991	1992	1993	1994
Vouchers..........	...	11,063	39,773	71,127	51,576	73,617
Certificates......	...	993	251,140	167,744	150,095	110,624
Loan Management...	1,437	11,588	4,993	12,982	7,784	1,437
Total...........	1,437	23,644	295,906	251,853	209,455	185,678

However, the Department has been reassessing the expiration situation and the timing of contract refundings. We are evaluating other data sources to verify, not only the number of contract expirations, but also the timing of these expirations. This information is crucial to our attempts to fund expirations prior to terminating subsidy payments. The data obtained from this further analysis is resulting in revisions to the number of units refunded each year and the cost of refunding.

The worst case is all units being terminated as they reach term. A more realistic scenario is replacement of the units either in-kind or with the eligible tenants receiving Certificates/Vouchers.

Loan Expirations. There also is the possible impact of the prepayment eligibility for FHA insured projects that commences upon the 20th year of the mortgage. The HCD Act of 1987 placed certain requirements upon prepayments. This statutory provision expires in February of 1990. The following is a chart of the maximum potential level of prepayments (worst case scenario) and an estimate of the portion of projects that will or are likely to prepay.

Year	Cumulative Thru 1989	1990	1991	1992	1993	1994
Total	30,189	27,597	40,285	46,414	50,109	69,779
Likely	16,873	14,786	19,483	20,169	19,082	27,013

Opt-Outs. The Section 8 Loan Management Set-Aside program (LMSA) allows owners of projects to terminate the contract at any of the 5-year renewal points. A rough estimate of the maximum potential opt-outs, ignoring final contract expirations, follows:

FY	1990	1991	1992	1993	1994
Units	72,000	6,300	57,300	73,200	46,100

A more realistic scenario is that only a very small percentage of those owners will actually opt-out. For the fiscal years 1986 through 1989 to date, only 8 projects with 3,400 units have opted-out. In each of those fiscal years, there were nearly 100,000 units at risk.

SENATOR KERREY: Will HUD propose a unit-for-unit replacement of these lost units?

ANSWER: As far as subsidy contract expirations are concerned, the Department's Budget estimates include provisions for the refunding of such contracts. As provided in the statute and HUD requirements, before an owner may prepay, a plan of action addressing the current tenant and project area needs must be approved by the Department. The plan must provide for low- and moderate-income tenants, including potential displacement, available and affordable housing in the area, and similar questions. In the case of a prepayment, current eligible tenants are provided with Section 8 rental assistance, relocation assistance, or both.

For opt-outs from LMSA contracts, the Department provides all eligible tenants with Section 8 Vouchers.

SENATOR KERREY: When units are lost, what are the procedures for relocating the affected persons?

ANSWER: In the case of prepayments of FHA insured mortgages, the owner must maintain the tenant's rent level as long as the tenant is economically eligible or provide for relocation. This includes determining the availability of comparable and affordable housing in the local area. When owners opt-out of LMSA contracts, eligible tenants are provided with Section 8 Vouchers. The tenants may use these to maintain their current residency if possible or move elsewhere.

SENATOR KERREY: Approximately how many units each year go to relocate persons displaced by CDBG projects?

ANSWER: There is no set-aside of Section 8 assistance to relocate persons displaced by CDBG projects and the Department has not collected data indicating the number of persons displaced by a CDBG project who are provided Section 8 assistance by the PHA. Our best estimate is that approximately 3,000 households (owners and tenants; all income levels) are displaced by CDBG programs annually. We estimate that fewer than 1,000 are provided Section 8 assistance. Under the Uniform Relocation Assistance (URA) and Real Property Acquisition Policies Act of 1970, as amended, persons displaced as a direct result of acquisition, rehabilitation, or demolition for a CDBG-assisted project are provided relocation payments and other assistance. Low- and moderate-income persons displaced by certain CDBG-assisted activities may choose alternative assistance under Section 104(d) of the HCD Act of 1974. As with the Rental Rehabilitation Program, however, most CDBG rehabilitation of tenant occupied property is designed to minimize displacement. In this context, lower-income households are more likely to receive Section 8 assistance to make the rehabilitated housing affordable.

SENATOR KERREY: How may scattered site units are there and what is the vacancy rate for those units?

ANSWER: There is no readily available source of data on the Section 8 programs that could identify units as scattered sites and provide the current occupancy data for such units. However, the vacancy rates for all Section 8 assistance programs are typically less than 3 percent.

SENATOR KERREY: Is there any pattern to unit loss--is it concentrated in urban or geographical areas?

ANSWER: So far, "unit loss" has not reached levels from which a "pattern" could be determined. Only 8 opt-outs have occurred and only one prepayment approved. The Department's concern is to be prepared for the potential loss presented by expirations of contracts starting in fiscal year 1990. The level of expirations will rise dramatically from that point on. Prepayments of FHA insured mortgages is an on-going concern with an increasing number of projects eligible each year. The requirements placed on prepayments in the HCD Act of 1987 will expire on February 5, 1990.

The major portion of units in Section 8 programs are located in urban and metropolitan areas. In particular, the Northeast, North Central, and large West Coast urban areas account for a large portion of the units.

SECTION 202 HOUSING

SENATOR KERREY: What is HUD's position on the metro/non-metro division of Section 202 funds?

ANSWER: HUD believes that the metro/nonmetro requirement should be removed, so that metro and nonmetro applications compete against each other in the same Field Office, and the strongest applications are selected.

SENATOR KERREY: Do you have figures indicating where the current need for Section 202 units is — urban vs. rural or geographically?

ANSWER: Based on applications received over the last several years, the current need is greatest for Section 202 units in urban areas. Both the number and the quality of applications tend to be greatest relative to the available funds in urban areas. Furthermore, the 202 program is experiencing some defaults, and these tend to be concentrated in rural rather than urban areas.

SENATOR KERREY: If the current 3% loan program is continued, how many units would HUD support for FY 1990?

ANSWER: There has been no 3 percent loan program since 1974. The Section 202 program was revised in 1974 and again in 1987. Interest rates are based on the average Treasury borrowing rate of 30-year notes made during the last quarter of the fiscal year preceeding the year in which the loan is made, plus an allowance for expenses. The estimated interest rate for 1990 is 7.85 percent.

SENATOR KERREY: HUD is emphasizing use of 202 funds for the handicapped. Specifically, what populations are you seeking to serve and how must these units be constructed to serve them?

ANSWER: The handicapped population which HUD seeks to serve is the same population currently served, the physically handicapped, the developmental disabled and the chronically mentally ill. These populations are best served in either independent living complexes (up to 24 units) or group homes (serving up to 15 persons).

SENATOR KERREY: Several housing authorities have indicated that the elderly need 202 projects because not only do they receive housing but often recreational and health services are available at such projects. Does HUD encourage the provision of these services in the projects and, if so, how?

ANSWER: HUD encourages sponsors to provide services to elderly residents, such as recreation and health screening. HUD allows a modest amount of common space in Section 202 projects, such as multipurpose rooms which can be used for such services. The Department does not have funds available (other than the CHSP) to pay for resident services, but sponsors, other non-profit groups and localities often provide these services.

SENATOR KERREY: For the elderly who receive assisted housing, 30 percent of income may be a significant amount, especially if there are pharmaceutical bills. Has any consideration been given to reducing the contribution requirements for the elderly?

ANSWER: We are not now considering a reduction in the contribution requirements for the elderly. However, two additional allowances are provided for families where the head of household or spouse is age 62 or older, handicapped or disabled, that relieve the burdens of these individuals to some extent.

In addition to an allowance of $400 for each household whose head or spouse is 62 years of age or older, handicapped or disabled, an allowance for medical expense allowance varies by whether the family has expenses for handicap assistance. If the household has no handicap assistance expenses, the allowance for medical expenses is the amount by which total medical expenses exceed 3 percent of annual income.

Total medical expenses include all such expenses that are anticipated to be paid by the household in the 12 months following the effective date of the certification/recertification, and not paid by an outside source such as insurance, medicare, etc. Medical expenses include physicians services, health care facilities, Medicare insurance premiums, prescriptions, transportation for treatment, dental expenses, eyeglasses, hearing aids and batteries, attendants care, and payments on accumulated medical bills.

CONGREGATE SERVICES

SENATOR KERREY: What congregate housing programs is HUD currently supporting?

ANSWER: Sixty projects are currently participating in the program, providing services to approximately 1,920 residents.

SENATOR KERREY: Why is there no request for funding for this program in FY 1990?

ANSWER: No funding is requested since the final evaluation of the demonstration concluded that the program was not successful in achieving its primary goal of preventing institutionalization of the elderly.

SENATOR KERREY: The homeless population consists of several groups with perhaps somewhat different needs — men, some of whom are physically and mentally disabled, single women, single mothers with children. Furthermore, there are short-term, emergency shelter needs and longer term ones. Please explain how the $425 million requested for HUD programs for the homeless will address the short and long term needs of these various population groups?

ANSWER: The McKinney Act itself recognizes the disparate types of homeless needs, and for that reason we have requested full funding for the full array of programs. We have, for example, the Section 8 Single Room Occupancy Program designed to help the single individual who requires a group situation in order to function. We have the Transitional Housing Program designed to provide longer term care beyond that offered by the Emergency Shelter Grants Program which is designed to facilitate the transfer of families and individuals to independent living. That program is designed to emphasize assistance to deinstitutionalize individuals, homeless with children, and the homeless with mental disabilities. The Permanent Housing for the Handicapped Homeless is designed to provide long term housing for those with physical and mental disabilities. Thus, the full range of those needing special assistance is targeted within one or more of the existing programs. We are also seeking funding for a new discretionary program which would provide funds in substantial amounts for a comprehensive approach to a locality's special needs - those homeless particularly in need and for whom adequate assistance is not available under the existing programs.

SENATOR KERREY: If the Emergency Food and Shelter Program operated by FEMA is moved to HUD, would you make any changes in its structure or procedures?

ANSWER: Not in the basic structure of the program. However, the GAO study made some recommendations for improvements and identified some problems which we would want to address. Our intention would, of course, be to make the program as effective as possible and we would involve the national organizations in any future changes. We intend to also look at the existing HUD programs to find ways to improve them.

SENATOR KERREY: Will HUD operate the program with the same number of staff as FEMA has been able to do?

ANSWER: We don't see a need to change the number of staff used for the program at this time.

SENATOR KERREY: Several articles have been very critical of the Interagency Council. Have you taken any steps to make it a substantive effective tool rather than a political one as it has been portrayed?

ANSWER: Since I was elected as Chairman of the Interagency Council on the Homeless, I have made numerous changes to ensure that the new Interagency Council is the viable and effective entity envisioned by Congress. I have staffed the Council with people who share my commitment to actively address the tragedy of homelessness. I have supplemented this staff with ten full-time Regional Coordinators from HUD who will, among other Council-related duties, give technical assistance to providers. The Council staff and the ten full-time Regional coordinators work with the newly-designated Headquarters and Regional contacts from the Council's member agencies.

With staff in place, the Council agencies are aggressively assisting the homeless on a number of fronts. For instance, the Council gives timely information to providers and other interested groups on all Mckinney Act as well as Federal non-McKinney homeless-related programs. Another form of assistance to providers is the Council's bi-Regional workshops. The first such workshop under the Interagency Council was held in Atlanta in mid-July. Topics which were addressed at this hands-on meeting included: Homeless Prevention; Providing Technical Assistance on McKinney Programs; Federal, State and Local Coordination; and Providing Integrated Services. A final example of how the Council is reaching out to better serve the homeless and those who assist them is formal and informal contact with individual providers, State and local officials, and advocacy groups.

SENATOR KERREY: Some cities understood that the Section 108 program would be available as a back-up after the UDAG program was terminated, but there is no budget request for 108. What is your rationale for no request?

ANSWER: The Department believes that a Federal program of this type is unnecessary and an inappropriate Federal intrusion into private financial loan markets. Localities are able to borrow funds on their own without a Federal guarantee. This program is not needed.

SENATOR KERREY: Section 312 rehabilitation loans have been very popular in most states. They have been used in conjunction with CDBG projects-and in in my state in some rural areas. What is the justification for terminating the program?

ANSWER: The Department believes that the CDBG and Rental Rehabilitation programs provide an appropriate level of Federal resources for housing rehabilitation. The Section 312 program is simply not a cost-efficient means of providing rehabilitation assistance and the program is a staff-intensive one for localities to run.

VOUCHERS

SENATOR KERREY: a. There has been some suggestion that vouchers are difficult for small housing authorities to administer. Have you had any input from small authorities on this?

ANSWER: We often meet with housing authorities of all sizes at national conferences and have not had any complaints regarding difficulties in administering housing vouchers because of PHA size.

b. How many vouchers do you think an authority would have to have to make it worthwhile to administer the program?

ANSWER: We have found that a minimum of 50 units is necessary in order to make the administration of a housing voucher program cost effective.

c. Are there ways to simplify the administration for smaller authorities or would they be better off with other assisted housing programs?

ANSWER: We believe the administration of the housing voucher program is fairly simple and straight forward. It is no more difficult or cumbersome than other assisted housing programs funded by the Department. The Department conducted a demonstration during

1986 involving small and rural area PHAs administering the housing voucher program. The preliminary results of the demonstration provide no evidence of PHAs having problems administering the program.

LEAD-BASED PAINT

SENATOR KERREY: Has HUD developed a program for the removal of lead-based paint from public housing projects and HUD-owned properties?

ANSWER: The Department currently is in the process of revising the National Institute of Building Sciences (NIBS) Guidelines and developing a "Crosswalk" between the guidelines and the Comprehensive Improvement Assistance Program. Both these documents will be available before the beginning of fiscal year 1990. They will serve as interim guidance for Public Housing Agencies and Indian Housing Authorities until the Department's Policy Development and Research (PD&R) demonstration is completed. After the demonstration, the Department intends to modify the guidelines and the "Crosswalk" to incorporate any findings from the demonstration.

SENATOR KERREY: Do you support the standards adopted by the National Institute of Building Sciences?

ANSWER: Since the Department still is in the process of reviewing the National Institute of Building Sciences (NIBS) guidelines, it is not possible to say at this time which standards are supportable and which ones will need to be modified.

HUD-HELD PROPERTIES

SENATOR KERREY: What is currently in the inventory of HUD-held properties?

ANSWER: The inventory of HUD-owned single family properties and multifamily projects as of April 30, 1989 is as follows:

	Cases	Units	Amount
Single family	50,109	54,751	$2,878,587,000
Multifamily	64	12,314	$ 206,060,000

SENATOR KERREY: What are your plans for disposing of these properties?

ANSWER: Single family properties will continue to be made available for sale through a competitive bid process which employs a number of sales incentives. These include performing a limited amount of repairs before sale, lower downpayments, repair escrows, painting and carpeting allowances to buyers, early closing bonuses, etc. Properties will also continue to be made available for sale to units of local governments, non-profit sponsors and Urban Homesteading agencies. The majority of those properties sold to units of local government and non-profit sponsors are used for housing the homeless.

Except for the one identified "soft rental market area" (Houston, TX), we intend to sell the HUD-owned inventory of multifamily projects under Departmental Management Goals: sell all projects within 12 months of acquisition or 15 months if the project is sold on a negotiated basis to conversion to a tenant-owned cooperation. HUD owns 13 projects with 2,612 units in the Houston area. We are holding these off the market until market conditions improve or until we know the sale will not have a negative effect on other HUD insured projects in the area.

QUESTIONS SUBMITTED BY SENATOR PATRICK J. LEAHY

RESIDENT MANAGEMENT

SENATOR LEAHY: Throughout your testimony before this Subcommittee on May 15, you cited, as a positive model for public housing tenants nationwide, the tenant organization at the Kenilworth-Parkside public housing complex in Northeast Washington, D.C. I agree with you on the great strides made by the tenants there to own and operate their own apartments, and to move out of poverty through business development.

However, I am concerned with a preliminary GAO report on the project, which cites the very high subsidy, per unit, that has fueled these positive changes at Kenilworth-Parkside. Do you believe that this successful model can reasonably be replicated elsewhere, in the absence of deep federal subsidies, local public dollars, and large sums of foundation and other private grants made available to this project, and without the efforts of the extraordinarily charismatic and well-connected Kimi Gray?

ANSWER: The Kenilworth-Parkside Public Housing project received approval for modernization funding under the Comprehensive Improvement Assistance Program (CIAP) in 1982 based on need. This occurred prior to HUD's approval of the sale of the project to the Resident Management Corporation (RMC). Federal assistance for modernization, therefore, played a limited role in the RMC's privatization efforts and did not represent an increase in planned Federal expenditures.

As to the specific unit rehabilitation costs, a recent analysis by HUD indicates that the Kenilworth-Parkside property is within Departmental cost guidelines. Even the preliminary General Accounting Office (GAO) report noted in its appendix that project costs were within the middle range of costs when compared to similar properties in the District of Columbia although press reports failed to note this fact.

As to other costs, the Federal rental assistance which is being paid to the project's residents for a transitional period of 5 years has replaced, on a dollar-for-dollar basis, the Public Housing operating subsidy previously paid to the District of Columbia's Department of Public and Assisted Housing for the project. This was an express condition of sale to ensure budget neutrality.

The sale of the Kenilworth-Parkside project did not involve any additional direct cost to the Federal Government and will save considerable tax dollars under resident ownership and management. An earlier study of the property conservatively estimated a 10-year savings of $4,520,385 that would accrue in the categories of improved rent collection, fewer vacancies and reduced welfare payments. In addition to the estimated savings, there would be increased local income tax receipts to the District of Columbia and new on-site social services such as day care and employment counseling as well as job placement which would be available to residents due to the activities of the RMC.

As to the efforts of Ms. Kimi Gray, though certainly extraordinary, she is the first to note that there are hundreds, maybe thousands, of low-income families residing in Public Housing that only need encouragement and some assistance in their desire to reach the self-sufficiency goals associated with Kenilworth-Parkside residents.

The Department has established a priority initiative to promote resident management and urban homesteading, but is not promoting "one-model" for replication. The Kenilworth-Parkside model is one approach. In other cities, the Low Income Tax Credit is being utilized to attract private sector involvement in project renovation. Recently, a homeownership cooperative was established in Nashville, Tennessee with no after-sale subsidy. Over the next year, HUD will assess a variety of approaches and models which are capable of affording broader opportunities for resident management, homeownership, and economic empowerment.

MODERATE REHABILITATION PROGRAM

SENATOR LEAHY: I appreciate your efforts to root out the obvious problems with the Section 8 moderate rehabilitation program. I want to remind you, however, of how effectively the program worked before it became a discretionary fund for consultants, rather than a well-targeted program for assisting low income people and economically depressed neighborhoods and communities. In Vermont, in the early 1980s, the program was well run by small for-profit developers, and by non-profit housing development corporations, and was favored by local officials for the modest, sensible work preformed under its guidelines, and its reasonable rent levels.

a. Is the Department looking at this earlier, positive track record as it endeavors to re-shape this program?

ANSWER: In response to the audit of the Moderate Rehabilitation Program conducted by HUD's Office of Inspector General, the Office of Housing has committed to revising, as needed, the regulations and Handbooks governing the Moderate Rehabilitation program. As the question notes, many of the problems identified in the audit were the consequence of regulations and requirements which were not followed, and not a function of the regulations themselves. At this time we have no conclusions about the future design of the Moderate Rehabilitation program, should it receive additional appropriations.

b. And in the case of moderate rehab projects that received pre-FY 1989 funding commitments, but are not as yet under construction, what is the Department's policy on proceeding toward construction?

ANSWER: The Department has directed PHAs administering the Moderate Rehabilitation program that no Agreements to Enter into Housing Assistance Payments Contract (Agreements) are to be executed for any units under Annual Contributions Contract (regardless of the source year of the funding), until HUD determines that the regulatory procedures for project selection and rent calculation have been followed.

SENATOR LEAHY: Specifically, I am concerned with one such project, that involving the rehabilitation of the so-called Depot Square Apartments in St. Johnsbury, Vermont, which involves one of the very best locations for senior and handicapped housing in this town of

8,000. I understand from the Vermont State Housing Authority that this project is on "hold".

c. Can you please tell me the status of the project within the Department, and describe what the Authority must do to move it forward to construction and completion as quickly as possible? The need for the units is great and growing.

ANSWER: In the case of the Depot Square Apartments in St. Johnsbury, Vermont, the HUD review has been completed and it has been determined that the project selection process for those 40 units conformed to the regulations. However, the Vermont State Housing Authority will have to recalculate the proposed project rents and submit them to the HUD Office in Manchester before an Agreement can be executed and construction begins.

MORTGAGE PREPAYMENTS

SENATOR LEAHY: I share Senator Mikulski's concern over what will be, over the next several fiscal years, a mushrooming problem with the possible prepayment and conversion of units assisted in the late 1960s and early 1970s under the HUD 221(d)(3) and 236 mortgage programs.

a. Is the Department plotting a plan of action for dealing with this serious, costly problem?

b. Has the Department commenced substantive discussions on this with the Congressional authorizing and appropriations committees? I strongly urge that we bring together the best minds of the Department and the four committees to forge a workable program of action on this by the end of this calendar year.

ANSWER: (a) The problems and issues of prepayment and the associated loss of low-income housing are not new concerns to HUD. In the early 1980's HUD started to focus on this problem and began discussions with industry groups to explore inducements. However, the 1986 Tax Act substantially changed the financial ground rules governing real estate investment and required the development of a new set of inducements.

The Department currently is offering incentives and inducements within its authority, including capital improvement loans, equity takeout loans, increased percentages on rates-of-return, in return for extended mortgage lock-in periods and retention of low-income housing restrictions.

(b) The Department is consulting with the various committees, industry, and public-interest groups to determine effective tools for dealing with this problem. The Department is currently considering related funding issues as part of the 1991 Budget.

SENATOR LEAHY: Once again on the 221(d)(3) and 236 prepayment issue, it has been my experience from working closely with Vermont non-profit developers on preservation projects that three particular forms of assistance--available through the Department--can be very useful to non-profit developers working to purchase and save projects threatened by prepayment. They are the flexible subsidy, loan management set-aside, and project-based certificate programs.

a. Does the Department share my enthusiasm for these mechanisms as part of the arsenal for attacking the preservation problem, along with various forms of State and local public and private financing?

ANSWER: Both the Flexible Subsidy and Loan Management Set-aside programs are identified as allowable inducements under the 1987 HCD Act to preserve the eligible prepayment projects. While the Section 8 project-based Certificate Program was not included, it most certainly could be used by State and local governments to preserve these projects.

HUD has had little experience regarding which inducements are the most effective, since there has been little activity. Owners are probably waiting to see what Congress does with the expiring legislation before progressing with their prepayment plans.

HUD believes that each of the inducements used either in conjunction with one another or separately, on a project-by-project basis, will result in most owners agreeing to extend the prepayment period for the remaining term of the mortgage.

The one Plan of Action approved, thus far, has involved no financial incentives from HUD. Local and State agencies provided assistance in this case, in the form of rental rehabilitation funds, relocation assistance, housing vouchers, bond financing and tax credits needed for the refinancing and renovation.

b. Do you believe that the Administration will support increased budget authority for these programs for FY 1991.

ANSWER: The Department is currently reviewing the subsidy and resource needs for preservation as part of the 1991 Budget development process. Among the options to be considered are the Loan Management Set-Aside, Voucher and Certificate programs.

HOUSING PRESERVATION PROJECT

SENATOR LEAHY: I have received and appreciated your letter of May 10, in response to mine of April 12, on the subject of the Northgate Apartments housing preservation project in Burlington, Vermont. This project is the well-coordinated response of a non-profit, community-based development team to a very serious HUD 221(d)(3) mortgage prepayment issue that I have raised.

I also want to thank you for dispatching three well-prepared, cooperative Department staff members--Donald Maddy, Donald Kaplan, and Frank Malone--to my office on May 12 to meet with me, my staff and representatives of the Northgate Apartments development team. I think that the meeting was a helpful one in the process of informing HUD of the many state and local financing resources now available to the project, and of making the case for expanded HUD participation. I appreciate the role you played in making this useful meeting possible.

a. In this regard, can you please tell me if staff has reported back to you on this project and the May 12 meeting at my office?

b. What is the status of this project in terms of the formal requests that the Northgate development team has made for flexible subsidy funding, and for HUD approval for a transfer of physical assets?

ANSWER: (a) My staff has informed me that the May 12, 1989 meeting at your office was very productive, indicating that the concerns of both the Development Team and HUD were addressed. I have instructed my staff to continue to offer their technical and programmatic guidance to the Development Team.

(b) The Development Team must formally submit three packages, the Transfer of Physical Assets (TPA) application, the Flexible Subsidy application, and the Plan of Action. Our Manchester Office has received only the TPA application, which was incomplete and was returned on June 6, 1989 to the Development Team.

EXPIRING CONTRACTS

SENATOR LEAHY: As you know, we will soon be facing a near-tidal wave of expiring contracts for certificates and vouchers under the existing Section 8 rent subsidy program. This form of assistance protects the elderly, the handicapped and low income families with children from paying more than 5% of their incomes for rent and utility costs. What is the Department's plan of action for dealing with this crisis, which will really begin to bear down on us in FY 1991. Has the Department begun to meet for substantive discussions with the Congressional authorizing and appropriations committees to work out approaches to solving the problem? Do you believe that the Administration is willing to make the necessary budgetary commitments, beginning in FY 1991, to extend these expiring contracts?

ANSWER: The FY 1990 Budget includes proposals for contract renewals in 1991 and future years as well as for 1990. The 1991-1994 figures included in the Budget are:

(In Billions of Dollars)

1991 - $8.6
1992 - 7.5
1993 - 6.4
1994 - 5.8

Although the 1990 numbers are currently being re-examined, no significant changes are expected in the magnitude of the future year requests.

SENATOR LEAHY: Generally speaking, do you support the new measures outlined in the National Affordable Housing Act introduced by Sens. Cranston and D'Amato?

ANSWER: We believe that several of the proposals of Senators Cranston and D'Amato are a constructive effort to address the housing problems facing the country. The Department is currently reassessing its position on affordable housing and may make its own recommendations.

SENATOR LEAHY: More specifically, do you agree with the need for, and design of, new initiatives to create the Housing Opportunity Partnership (HOP) program, the HOME program, and new office of Assistant Secretary for Supportive Housing at HUD?

ANSWER: We are now working on specific approaches for assisting poor renter households and the homeless within a realistic budget. They may not be the same as now being considered in the Congress.

QUESTIONS SUBMITTED BY SENATOR JAKE GARN

RENEWALS AND PRE-PAYMENTS

SENATOR GARN: Mr. Secretary, in my opening statement, I alluded to the difficulty in clearly addressing the perceived need to augment the Federal effort towards the housing problems of the Nation. In an earlier speech, I noted that years ago I told then Secretary Pierce that it was a good thing that neither he nor I would be around when all the Section 8 certificates and Vouchers were up for renewal in 1990, and when opt-outs and pre-payments came due, because I couldn't see how we would be able to find the money to meet the enormous cost of keeping these existing units under subsidy. I have subsequently noted that I was only half wrong...those obligations are coming due as expected, but I'm still here.

I understand that the Chair asked a similar question, yesterday, but for my benefit: What is required to renew expiring section 8 certificates and vouchers in fiscal year 1990?

ANSWER: The Budget reflects funding 23,644 replacement vouchers at a cost of $667,351,900 in 1990. However, HUD is currently reevaluating these numbers and will make any necessary changes. Of special concern to HUD is that the refundings occur quickly to preclude the possibility of interrupting subsidy payments.

Senator Garn: What is also required to address those units covered by section 236 and 221(d)(3) loan guarantees for which the owners are legally entitled to opt-out or prepay their outstanding balances and thereby displace low-income families?

ANSWER: We can only estimate the future costs of units covered by section 236 and 221(d)(3) because we do not know how many owners will "opt-out" of a Housing Assistance Payment (HAP) contract or prepay outstanding mortgage balances. The Department is currently working with the tools provided by the HCD Act of 1987 and will be preparing additional options to Congress to cope with the problem.

Senator Garn: Please provide for the record a ten-year projection of the number of units at risk and cost to address this problem.

ANSWER: The 1990 Budget assumed there would be 3.1 million contract expirations over the 10-year period, 1990-1999. We expected that refunding of these contracts would cost $99 billion if vouchers were used and $166 billion, if refunding "in kind." However, as noted in the response to an earlier question, the Department is currently reevaluating both the number of expirations which can be expected and the timing of the refunding. Both of these factors could significantly impact the number and cost of expiration refunding.

The Department does not have an estimate of the number of owners of eligible projects who will elect to prepay their mortgages. However, we estimate that of the 600,000-unit universe of potential prepayments, only about 364,000 units would be eligible for prepayment by the year 2006. Of the amount only about 154,000 are deemed likely to prepay. The 1987 HCD Act authorizes the use of several "inducements" to keep project owners from prepaying. However, only one prepayment has been approved so far and there is a wide variety of options open in addressing this problem, so that it is not now possible to develop an estimate of the potential costs.

A similar situation exists with regard to opt-outs. The potential universe for opting-out is large but actual activity so far has been limited. Since 1986, only 8 projects have opted-out, containing 3,400 units. The Department's 1991-1994 Budget estimates assume that vouchers will be made available for tenants involved in opt-outs. However, no long-term estimate is available.

Federal Role in Public Housing

SENATOR GARN: A while ago I received a request that the Federal Government pay for the removal of the foundations of the demolished Pruitt-Igoe housing development so the city of St. Louis could use the site for an industrial park. The argument was made that the Federal Government was responsible for the construction of this failed housing project and therefore is also responsible for its total removal.

As a former mayor, I'm sympathetic to the economic development goals of the City, as well as the budgetary constraints it confronts in promoting growth and reversing inner-city decay and blight. I was struck, however, by the attitude that public housing was something imposed on the city by the Federal Government, and not a shared responsibility. And while most public housing authorities are subdivisions of the local or State government, they depend almost exclusively on the Federal Government for their operating and construction subsidies.

Does this perception of limited State and local participation in public housing concern you, and if so, what ideas do you have for addressing it?

ANSWER: Yes, certainly it concerns the Department. Such perceptions no longer have any reality or place in today's world. Resources are finite. Partnership and cooperation and shared responsibility are necessary to address today's problems of preserving the publicly assisted housing inventory and expanding the supply of affordable and decent housing. The Federal Government no longer can be looked to for all the answers and certainly not for all of the funds.

HOUSING AND TAX POLICY

SENATOR GARN: It has been frequently observed that the direct Federal financing of housing and urban development funded through HUD is only a fraction of the total governmental program, and that the bulk of this support is provided through our tax policies. Indeed, deductibility of mortgage interest on owner-occupied homes alone represents a "tax expenditure" exceeding $30 billion, more than double your Department's subsidized housing outlays.

Your statement requests "adequate flexibility" to use Tax Code inducements as a means to preserve low-income housing. What steps are you taking to identify existing and potential Tax Code provisions?

ANSWER: I support the use of the Tax Code to promote the achievement of socially desirable objectives, including the preservation of low-income housing. Since the 1986 revisions to the Tax Code, the principal tax incentive available to develop, rehabilitate, and preserve low-income housing is the low-income housing tax credit. The Department is conducting an evaluation of the tax credit which will be completed by the fall of 1989 and is reviewing all proposals which have been made to extend and expand the tax credit, focusing particularly on the use of the credit to preserve low income housing. Finally, I have instructed my staff to consider tax incentive alternatives to programmatic solutions to problems which the Department believes require a Federal response.

Lead-Based Paint

SENATOR GARN: A matter that this Subcommittee has repeatedly confronted is the desire to remove lead-based paint from public housing, and other subsidized units. Unfortunately, this represents an enormous cost burden, and is not without a high degree of question as to how such abatement should be accomplished, and how such efforts rank in terms of priority in a very constrained budget. We now have pending your request to fund additional security activities to curb illicit drug activity along with the HUD contracted lead-based paint abatement guidelines from the National Institute of Building Sciences which have been strongly questioned in several minority opinions by participants in the effort. How high a priority do you give to lead-based paint abatement relative to efforts to curb drug activity and other needs in public housing?

ANSWER: The elimination of lead-based paint hazards and elimination of illegal drugs in Public and Indian Housing are both statutory requirements. Therefore, the Department gives preferences for each under the Comprehensive Improvement Assistance Program (CIAP). Under the CIAP, it is possible to fund lead-based paint and activities to eliminate the use of illegal drugs as an emergency, or as part of a special purpose or a comprehensive modernization program. PHA Notice 89-15 issued April 4, 1989 gives Public Housing Agencies and Indian Housing Authorities specific guidance about integrating drug prevention activities into the CIAP.

SENATOR GARN: Last year I sponsored the amendment to cut the appropriation for the Interagency Council on the Homeless because of my concern that it was not effectively attempting to coordinate Federal efforts to assist the homeless. And frankly, I am dubious about our general inclination to establish councils and coordinating committees whenever we confront a new issue, rather than admitting that there are some problems that the Federal Government is poorly positioned to address.

What changes are you making to assure that the dollars spent on the Council are effectively utilized?

ANSWER: I wholeheartedly share your concern that Federal dollars be used effectively. In fact, the McKinney Act, which authorized the Interagency Council and many of the Federal homeless assistance programs, requires the Council to review all Federal activities to assist the homeless and then "reduce duplication" among these activities.

Since becoming the Council's Chairman I have made numerous suggestions to encourage effective coordination of the various Federal assistance programs for the homeless. I have requested active participation in Council matters by each member agency. And, in fact, the sub-Cabinet level designees have met frequently to discuss how the Council can better serve the homeless through program and policy improvements.

I have put together a qualified staff to coordinate and participate in the implementation of the operational requirements of the Act such as providing technical assistance to organizations helping the homeless. To ensure that homeless providers and others in the field are adequately assisted. I have assigned one full-time staffer in each Region to coordinate Federal homeless assistance activities.

In addition, I have directed the Council staff to conduct site visits to monitor and evaluate Federal, State, and local homeless assistance activities, as required by law. Information collected through these regionally scheduled visits, the Council's bi-regional workshops, as well as face-to-face meetings with State and local government officials, providers, and advocacy groups, will serve as a basis for any Council recommendations for change.

Operating Subsidy Priority

SENATOR GARN: Public Housing Authorities have expressed their concern over the failure to fully fund the F.Y. 1989 Performance Funding System (PFS) which is used to compute their operating subsidy requirement. Furthermore, they indicate that this shortfall will grow if we provide the level you have requested for this activity in F.Y. 1990. How high to do you rank this basic program in assisting the effective operation of public housing projects?

ANSWER: Fully funding Operating Subsidy requirements is a high priority in ensuring the effective operation of Public and Indian Housing projects. The shortfalls are the result of changing economic situations and not any attempt to underfund Public Housing Agencies or Indian Housing Authorities. One of Secretary Kemp's priorities for the Department is to maintain the supply and availability of low-income housing. Adequate operating subsidies are required to meet this goal. Based on the current calculation of Operating Subsidy needs, the budget estimate of $1,694.2 million will fund requirements at 100 percent for 1990.

SENATOR GARN: As a former mayor, I strongly supported the establishment of the Federal Revenue Sharing program as a trade-off against the proliferation of smaller categorical programs which demanded enormous levels of paperwork and recordkeeping. True to form, Congress enacted Revenue Sharing, but failed to eliminate these categorical programs. And during the high deficit period of this decade, sacrificed Revenue Sharing to save the remaining categorical programs so we are basically back to where we started in the early 1970s. Unfortunately, I don't hear anyone talking about simplifying the relationship between the Federal Government and local government now, but rather, I am hearing about more demonstration programs and more "targeted" grant efforts, all of which involve large bureaucracies. Does this concern you?

ANSWER: It is true that we have looked at the targeting of funds. This neither involves any large bureaucracy--usually just a few staff-years are needed--nor does it return us to the 1970s when large numbers of categorical programs existed. Rather, due to the budgetary squeeze the Federal Government finds itself in, resulting in less money than we otherwise might desire, it becomes increasingly essential to make sure that these limited resources go to those segments of our society that are in most need.

QUESTIONS SUBMITTED BY SENATOR MARK O. HATFIELD

THE NEHEMIAH HOUSING OPPORTUNITY PROGRAM

SENATOR HATFIELD: As you know, the Nehemiah program establishes a revolving loan fund to assist low and moderate income individuals to buy rehabilitated homes in troubled neighborhoods. The loan amount, $15,000, is secured by an interest-free second mortgage that isn't paid off until the original owner sells or transfers the property. To be eligible for funding, a city must devise a plan to construct or rehabilitate a minimum number of homes in an area at one time. This wholesale upgrading of a neighborhood will make it considerably easier to find interested homebuyers, who otherwise might be reluctant to invest in a marginal area. It is my understanding that HUD has recently concluded drafting regulations for the Nehemiah program.

Under the enabling legislation contained in the Housing and Community Development Act of 1987, P.L. 100-242, Congress provided that federal grants are to be made available for the construction of homes on contiguous parcels of land. It is the definition of "contiguous" which is threatening the participation of cities such as Portland, Oregon which do not have large amounts of vacant land for single family homes. It would be detrimental to the principal purpose of this program - to make home ownership available to moderate income individuals - to have this language construed to deny grants to communities that cannot build all of their housing units right next to each other. To narrowly construe eligibility would eliminate participation of most of our Nation's communities.

a. Do the draft regulations adequately reflect congressional intent by defining "contiguous" to include housing units for rehabilitation which are not necessarily located right next to each other?

ANSWER: In the final regulations for the program, published in the Federal Register on May 22, 1989, the Department provided a more flexible definition for "contiguous" that, we believe, adequately reflects Congressional intent and is consistent with HUD's legal interpretation of the statutory language. The excerpt from the final regulation showing the the revised definitions for "contiguous" is attached as Exhibit A.

b. When will the draft regulations obtain final approval at HUD and be forwarded to the Federal Register for publication?

ANSWER: The final regulations were published in the Federal Register on May 22, 1989.

c. What will be the time period for cities to make application for Nehemiah funds once the final regulations have been issued?

ANSWER: It is the Department's intent to begin accepting applications as soon as the Notice of Funding Availability is published, about June 15, 1989 and to continue to accept applications for 60 days thereafter.

EXHIBIT A

Information collection requirement	Section of CFR affected	Number of respondents	Number of responses per respondent	Total annual responses	Hours per response	Total hours
Application submission requirements	§ 280.105 (a) and (e); § 280.110 (a) and (b); § 280.205; § 280.215 (b)(2)(i), (b)(2)(iv), (b)(6) and (b)(7); and § 280.207(a)(5).	150	1	150	8.00	1,200.0
Affirmative fair housing marketing requirements	§ 280.207(a)(6)	10	1	10	3 minutes	.5
Racial and ethnic data collection requirement	§ 280.207(a)(7)	10	145	1,450	3 minutes	72.5
Lead-based paint reporting and recordkeeping requirement.	§ 280.207(b)	2	145	290	.50	145.0
Grant agreement	§ 280.305(a)	10	1	10	2.00	20.0
Request for modification of requirement for eligible buyers.	§ 280.315(c)	5	1	5	1.50	7.5
Sales contract requirement	§ 280.320(a)	10	145	1,450	.50	725.0
Request for reimbursement	§ 280.320(b)	10	145	1,450	.50	725.0
Loan and second mortgage requirement	§ 280.322(a)	10	145	1,450	.50	725.0
Request for HUD approval of sale or transfer	§ 280.330(a)	10	45	450	1.50	675.0
Total burden hours						4,295.5

List of Subjects in 24 CFR Part 280

Grant program: housing and community development, Loan program: housing and community development, Low- and moderate-income housing.

For the reasons set forth in the preamble, Title 24 of the Code of Federal Regulations is amended to add a new Subchapter E to Chapter II to read as follows:

PART 280—[AMENDED]

SUBCHAPTER E—GRANT PROGRAMS

PART 280—NEHEMIAH HOUSING OPPORTUNITY GRANTS PROGRAM

Subpart A—General

Sec.
280.1 Applicability and scope.
280.5 Definitions.
280.10 Waiver.

Subpart B—Assistance Provided

280.100 NHOP Assistance.
280.105 Assistance under other HUD programs.

Subpart C—Program Eligibility Requirements

280.105 Program size.
280.110 Program location.
280.115 Home quality.

Subpart D—Application and Selection Procedures

280.200 Notice of fund availability.
280.205 Application requirements.
280.207 Other Federal requirements.
280.210 Selection process.
280.215 Threshold requirements.
280.220 Ranking criteria.
280.225 Final selection.

Subpart E—Program Operation

280.300 Obligation of funds.
280.305 Grant agreement.
280.310 Minimum participation.
280.315 Eligible purchasers.
280.320 Sales contract and downpayment requirements.
280.322 Loan requirements.
280.330 Repayment of loan.
280.335 Funding amendments and deobligation of funds.

Authority: Sec. 611, Housing and Community Development Act of 1987 (Pub. L. 100-242, approved February 5, 1988); sec. 7(d), Department of Housing and Urban Development Act (42 U.S.C. 3535(d)).

Subpart A—General

§ 280.1 Applicability and scope.

(a) *General.* This part establishes the Nehemiah Housing Opportunity Grants Program (NHOP) contained in Title VI of the Housing and Community Development Act of 1987 (Pub. L. 100-242, approved February 5, 1988). Under this Program, HUD is making grants to nonprofit organizations to be used to provide loans to families purchasing homes constructed or substantially rehabilitated in accordance with an approved program under this part.

(b) *Purpose.* The purposes of NHOP are:

(1) To encourage homeownership by families who are not otherwise able to afford homeownership;

(2) To undertake a concentrated effort to rebuild the depressed areas of cities and to create sound and attractive neighborhoods; and

(3) To increase the employment of residents of these neighborhoods.

§ 280.5 Definitions.

As used in this part:

Applicant means a nonprofit organization that submits an application for assistance under this part. The term applicant includes two or more nonprofit organizations submitting a joint application.

Assistance means grants to recipients for the purpose of providing loans to families purchasing homes constructed or substantially rehabilitated in accordance with an approved program.

Contiguous parcels of land mean parcels of land that:

(a) Abut;

(b) Are divided only by natural or man-made boundaries (such as streets, rights-of-way, or similar divisions); or

(c) Are closely located. For the purposes of paragraph (c) of this definition, parcels will be considered to be closely located if:

(i) The majority of homes to be constructed or substantially rehabilitated in the neighborhood are located on parcels that:

(A) Abut;

(B) Are divided by natural or man-made boundaries (such as streets, rights-of-way, or similar divisions); or

(C) Are divided by a small number of lots that do not, in the Secretary's determination, detract from the objective of fostering a concentrated effort to rebuild depressed areas and to create sound and attractive neighborhoods; and

(ii) The remaining homes to be constructed or substantially rehabilitated in the neighborhood are located on parcels in one or more areas, in which the parcels for each such area:

(A) Meet the requirements of clause (A), (B) or (C) of paragraph (c)(i) of this definition; and

(B) Are separated from the parcel referred to in paragraph (c)(i) of this definition by a distance, at the closest point, of no more than two city blocks (exclusive of any natural or man-made boundary).

Date of purchase means the date that a family executes a sales contract for the purchase of a home under this part.

FEDERAL ENTERPRISE ZONES

SENATOR HATFIELD: Under the Federal Enterprise Zone Statute Section 825-143, applicants must qualify under three of four distress criteria including: poverty; unemployment; and population loss or low income in order to obtain a federal designation. Public incentives and programs can be maximized within the states by having the State-designated Zone redesignated as federal by HUD. In Portland, for example, the North/Northeast Portland Enterprise Zone includes a sizable population base of low income residents, as well as developable industrial and commercial properties. The properties are expected to support job-creating business projects that will employ Zone residents. These areas in the Pacific Northwest, however, will not qualify for a federal designation because they cannot meet all of the criteria for the program. The statutory distress criteria appear to restrict the possibility of combining the resources of a ready and available labor force with developable land for business relocation and expansion.

(1) Please comment on the following changes to the Federal Enterprise Zone Statute.

A. That a qualified nominated area be one that is designated as a State Enterprise Zone under State statutes and related rules, which have been reviewed and approved by the Secretary;

B. That a qualified area meet only two of the four currently listed distress criteria set forth in Section 825-143, and/or

C. That preference points be established for qualified applicants that demonstrated significant local incentives to leverage Federal tools.

ANSWER: We are aware of the problems encountered by the City of Portland and will try to correct them as we flesh out the details of the President's Enterprise Zone initiative. I believe designations should be made competitively, based on both levels of distress as well as local commitment to the zone's success. In this context, my comments on the proposed changes are:

A. That a qualified nominated area be one that is designated as a State Enterprise Zone under State statutes and related rules, which have been reviewed and approved by the Secretary

State enterprise zone programs are strong evidence of commitment by State and local governments to leverage Federal enterprise zone initiatives. As such, they can be an important component of State and local plans of action and should receive special consideration in Federal enterprise zone designation. However, there are a wide variety of other strategies demonstrating State and local commitment, and I would not want to legally exclude these poverty areas from our "greenlining" efforts.

B. That a qualified area meet only two of the four currently listed distress criteria set forth in Section 825-143,and/or

C. That preference points be established for qualified applicants that demonstrated significant local incentives to leverage Federal tools.

The Administration's proposed legislation will recommend eliminating two of the four criteria for distressed areas. The two remaining criteria are poverty and unemployment; urban areas would need to meet both of these thresholds and rural areas would need to meet only one of these requirements. We propose that the distress criteria be 1.5 times the national unemployment rate, and an average poverty rate of twice the national average. As noted above, designation will also be based in part on the relative merits of the course of action. We strongly support giving preference points to those communities that demonstrate a strong local commitment to leverage Federal enterprise zone incentives. These efforts might include enhancing the quality of life, improving infrastructure, beginning programs on crime prevention, or strengthening anti-drug efforts in poverty areas.

QUESTIONS SUBMITTED BY SENATOR CHARLES E. GRASSLEY

SECTION 202 HOUSING FOR THE ELDERLY OR HANDICAPPED

SENATOR GRASSLEY: On Monday, January 9th, when HUD sent up its proposed 1990 Budget,--in its new release I noticed that the agency talked about elimination of non-metropolitan quotas for the Section 202 Housing for the Elderly or Handicapped program.

Could you explain the proposed changes and why the need for the changes.

ANSWER: Under the new program of loans for the Section 202 Housing for the Handicapped, separate allocations for metropolitan and non-metropolitan areas, and allocations down to the Field Office level (allocations are made to Regions) were eliminated because:

- The amount of funding provided is too small to divide by metro/non-metro areas. The result would be allocations too small for project feasibility. In two Regions, for example, the total allocation of units is fewer than 100. Two other Regions have allocations of less than 110 units.
- The elimination of the metro/non-metro quota does not mean that non-metro areas cannot compete for funds. Rather, HUD found that the emphasis of the program is primarily on the range of services to be provided to handicapped families, the opportunity for independent living and participation in normal activities, and access by handicapped families to the community at large and to employment opportunities. It is in the best interest of the programs to fund the highest ranked applications servicing these goals without regard to the location (metro or non-metro) of the project.

SENATOR GRASSLEY: I have also been interested in the Neighborhood Reinvestment Corporation and their work in communities. Do you support this program and would you support an increase in their secondary loan authority to allow them to do more work in communities.

ANSWER: I support the work of the Neighborhood Reinvestment Corporation. Their excellent work over the years has resulted in the rebirth of many urban neighborhoods. I would reserve judgment on supporting an increase in the Corporation's secondary loan authority until I know more about the shape and amount of any such proposal.

SENATOR GRASSLEY: The NHS of Des Moines currently manages a CDBG portfolio of loans totaling $540,000. This program has an excellent track record in rebuilding a number of Des Moines' more seriously deteriorated neighborhoods, both in terms of the housing stock and social fabric. One of the tools critical to their success has been their ability to attract private investment capital at low interest rates through the use of grant monies as a guarantee fund.

Would you be open to asking the HUD regional office to explore the possibility of waiving or adjusting on a demonstration basis, some of the use restrictions and regulations currently in place on CDBG funds so that the Des Moines NHS could undertake some initiatives - such as expansion on their local guarantee fund — which would be more responsive to the needs of their neighborhoods? The bottom line being that resources can be more responsive to local community needs when they are flexibly implemented to respond to the dynamics of local communities.

ANSWER: My staff in the Omaha Field Office have made a number of observations regarding the Neighborhood Housing Services (NHS) use of Community Development Block Grant funds. The suggestions given to the City of Des Moines, if implemented by NHS, might permit HUD to consider certain waivers if the circumstances warrant such consideration. I will defer a decision on this until Field staff complete their analysis of the NHS operations in the monitoring visit to the City of Des Moines scheduled for this summer.

QUESTIONS SUBMITTED BY SENATOR BROCK ADAMS

DRUG PREVENTION ACTIVITIES

SENATOR ADAMS: Last year, your Department co-sponsored an anti-drug task force report with the National Association of Housing and Redevelopment Officials. Mr. Harry Thomas, Executive Director of the Seattle Housing Authority, was a member of that task force. As you are also aware, Mr. Thomas has instituted some innovative anti-drug efforts in his organization, including work and coordination with local police, legal services and non-profit employment and children's arts groups.

The task force suggested that special initiatives between local law enforcement agencies, city and state services and the public housing authorities should be encouraged. As well as providing additional security, this could mean providing self-sufficiency options for tenants in the form of day care and job training. Has HUD surveyed its public housing authorities to determine present and unmet need in these areas?

ANSWER: The Department recently requested reports from all Public Housing Agencies (PHAs) about their drug elimination efforts. Some of the reports did mention the need for self-sufficiency options for tenants such as day care, job training and, especially, employment opportunities. Some PHAs indicated that their young tenants must "say no" to drugs and also have the opportunity to "say yes" to something positive, namely jobs or organized youth activities. There are many success stories in Public Housing where residents have taken control of their own lives by seeking positive employment opportunities and organized youth and adult activities as an alternative to the drug culture.

Improved coordination among social service and law enforcement agencies and PHAs helps to make services such as job training, child care and youth sports or education activities available to Public Housing residents. The Drug Information and Strategy Clearinghouse which is being established in the Department pursuant to the Anti-Drug Abuse Act of 1988 will work to help PHAs and resident groups plan ways to develop comprehensive and coordinated anti-drug strategies.

SENATOR ADAMS: Have you determined levels of cost under various program scenarios?

ANSWER: The Department has not developed an estimate of the total amount needed for anti-drug activity in Public and Indian Housing. However, substantial amounts currently are being spent on such activities from Operating Subsidy and Comprehensive Improvement Assistance Program funds. The 1989 Supplemental Appropriations Act provides $8.2 million under Operating Subsidies for drug prevention activities in Public and Indian Housing projects. Any additional funds should be provided through a competitive grant program so that they can be efficiently used to target varied problems in appropriate ways.

SENATOR ADAMS: Could a program be coordinated with other federal agencies such as DOL?

ANSWER: The Department currently is working with the Department of Labor to implement the Job Training Partnership Act in Public Housing.

SENATOR ADAMS: Obviously, the security or enforcement side of controlling illegal drug activity, generally, is a critical component of any overall solution. In fact, that is why as chair of the D.C. subcommittee, I support using members of the Capitol Police to help provide additional resources in the district.

In this context, what is your opinion of the task force recommendation that drug dealing within 25 feet of a public housing project be punishable under federal law? (This is similar to the enhanced criminal provision making drug dealing within 1000 ft. of a school or playground punishable under federal law).

ANSWER: The Department traditionally has allowed Public Housing Agencies (PHAs) the latitude to establish their own security methods for their individual needs, particularly in maintaining defensible space for the residents. If a PHA and the local police determine that a drug-free zone is needed around a Public Housing project, then it is up to the local authorities to establish one and to establish the appropriate penalities for those who violate it. The Anti-Drug Abuse Act of 1988 addressed this issue by requiring that the Public Housing lease provide for termination of tenancy where residents, a member of their family, or a guest should "engage in criminal activity, including drug-related criminal activity, on or near public housing premises..." (emphasis supplied).

SUBCOMMITTEE RECESS

Senator **Mikulski.** The subcommittee will now stand in recess until Thursday, May 18, when we'll take testimony from congressional, outside, and other public witnesses. The hearing will take place in SD–116. We are in recess.

[Whereupon, at 11:55 a.m., Tuesday, May 16, the subcommittee was recessed to reconvene at 10 a.m., Thursday, May 18.]

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